2001-06

A study of contract types used by the Armament Corporation of South Africa (ARMSCOR)

Lebelo, Kopano Peter.

http://hdl.handle.net/10945/10929

NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

A STUDY OF CONTRACT TYPES USED BY THE ARMAMENT CORPORATION OF SOUTH AFRICA (ARMSCOR)

by

Kopano Peter Lebelo

June 2001

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REPORT DOCUMENTATION PAGE			*Form Approved OMB No. 0704-0188*
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.			
1. AGENCY USE ONLY ***(Leave blank)***	**2. REPORT DATE** June 2001	**3. REPORT TYPE AND DATES COVERED** Master's Thesis	
4. TITLE AND SUBTITLE: A Study of Contract Types Used by the Armament Corporation of South Africa (ARMSCOR)			**5. FUNDING NUMBERS**
6. AUTHOR (S) Kopano P. Lebelo			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000			**8. PERFORMING ORGANIZATION REPORT NUMBER**
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A			**10. SPONSORING / MONITORING AGENCY REPORT NUMBER**
11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.			
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for Public Release			**12b. DISTRIBUTION CODE**

13. ABSTRACT (maximum 200 words)

Defense acquisition in the Republic of South Africa is performed by the defense procurement agency called the Armament Corporation of South Africa (Armscor). The agency is faced with the challenge to acquire products and services effectively and efficiently and within a limited budget. One of the elements that contribute to increased efficiency in procurement is the reduction of contract risk. The agency's regulations presently allow the use of fixed-price contracts that limits its capability to mitigate risks especially in the procurement of specialized and complex military products. The study is organized in the following manner. Firstly, it presents structures; policies and regulations that govern contract types. Secondly, it reviews contract types used by the U.S. Federal agencies and other countries. Thirdly, it analyses Armscor's contracting procedures related to contract types. Lastly, the study recommends contract types that are suitable for the South African defense agency and changes that should be adopted before they can be incorporated. The research recommends a contract type model for Armscor.

14. SUBJECT TERMS Armscor contract regulations, Federal Acquisition Regulation, fixed-price, cost-reimbursement, incentive contract types			**15. NUMBER OF PAGES** 118
			16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT Unclassified	**18. SECURITY CLASSIFICATION OF THIS PAGE** Unclassified	**19. SECURITY CLASSIFICATION OF ABSTRACT** Unclassified	**20. LIMITATION OF ABSTRACT** UL

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18

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A STUDY OF CONTRACT TYPES USED BY THE ARMAMENT CORPORATION OF SOUTH AFRICA (ARMSCOR)

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Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
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Defense acquisition in the Republic of South Africa is performed by the defense procurement agency called the Armament Corporation of South Africa (Armscor). The agency is faced with the challenge to acquire products and services effectively and efficiently and within a limited budget. One of the elements that contribute to increased efficiency in procurement is the reduction of contract risk. The agency's regulations presently allow the use of fixed-price contracts that limits its capability to mitigate risks especially in the procurement of specialized and complex military products. The study is organized in the following manner. Firstly, it presents structures; policies and regulations that govern contract types. Secondly, it reviews contract types used by the U.S. Federal agencies and other countries. Thirdly, it analyses Armscor's contracting procedures related to contract types. Lastly, the study recommends contract types that are suitable for the South African defense agency and changes that should be adopted before they can be incorporated. The research recommends a contract type model for Armscor.

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ACKNOWLEDGMENTS

Over the course of writing what is ostensibly one's thesis document, it is startling to discover how dependent one becomes upon others. It is the most pleasant of obligations to acknowledge this accumulated indebtedness. The first imperative is to thank Professor Cuskey and Dr. David V. Lamm for their interest and indispensable support throughout the process. Finally, and most importantly, I must acknowledge my two pillars of support who have always encouraged me to 'go for it' – my wife, Tebogo and my daughter, Lerato Pamela. No man is an island nor should he ever have to be.

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I. INTRODUCTION

A. GENERAL

The Armaments Corporation of South Africa (Armscor) is the national procurement agency overseen by the Ministry of Defense of the Republic of South Africa. It was established to meet South Africa's needs for the procurement of armaments and related products and services. [Ref. 1] In 1962, the former South African Government decided to expand the defense related industries in the face of increasing international isolation. This isolation was caused by apartheid and growing resistance domestically and in the region. At that time, armaments production was largely in the hands of private industry.

By 1964, the first step taken was the formation of a statutory body or the Armaments Production Board, which was responsible for procurement for the then South African Defense Force (SADF) and for establishing and managing public sector defense-related industries. The Board was also tasked with the coordination of arms production in the private sector, and by 1966 nearly one thousand private sector firms were involved in various aspects of domestic arms production.

In 1968, the Armaments Production Board was renamed the Armaments Board and tasked with procuring armaments for the SADF, as well as with ensuring the optimal utilization of the private sector. In the same year, the Government of the Republic of South Africa established the Armaments Development and Production Corporation of South Africa (Armscor) [Ref. 1] with the mandate to foster and develop South Africa's domestic defense industry and to supervise the manufacture of armaments. During the

next few years, Armscor took over various private sector companies and established a number of new production, and research and development facilities.

The main reason for creating Armscor was fundamentally strategic in nature primarily due to the critical concerns of the South African Government at that time. In 1982, Armscor began to market South African products abroad, proving that many were unique while providing superior solutions for a wide range of needs. However, by 1989, tension in South Africa had declined, and demand for arms had decreased sharply. As a result, Armscor's activities needed to be reorganized.

The status quo changed on 1 April 1992 when the South African Government formed a state owned corporation, called Denel Pty (Ltd), operating under the Department of Public Enterprise. [Ref. 2] Denel took over the responsibilities of manufacturing and selling arms. Armscor retained the acquisition responsibilities. Armscor became responsible for promoting and facilitating the marketing activities of the wider South African defense industry and market's surplus equipment on behalf of the South African National Defense Force (SANDF). [Ref. 2]

The changes in 1994 in South Africa's regional standing was marked by its admission to the Southern African Development Community (SADC). SADC is a twelve-member organization (Angola, Botswana, Lesotho, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe) whose aim is to promote regional cooperation in economic development and security affairs. [Ref. 2]

The defense budget of South Africa is declining much faster than that of its neighbors; this decline has affected the procurement budget. The effect of this reduction

causes concern about the future security arrangements in the region. A further concern is the survivability of the defense industry.

This research attempts to review the defense contracting process used by the South African defense agency Armscor. The research intends to find ways for the defense industry to continue supplying products and services within the new limited budget. The researcher identified contract types selection as an element of risk mitigation for the South African Government and the contractors ultimately reducing unnecessary costs to the Government. Armscor regulations only promote the use of fixed-priced type contracts, while international literature recommends the use of many other contract types depending on how well the Government can define its requirements. The literature also recommends the use of fixed-prices when the risk involved is minimal or can be predicted with an acceptable degree of certainty. The research identifies problems experienced when contracting on a fixed-priced type contract where financial risk is involved, in long-term projects or in research and development projects. The alternative to fixed-price contracts is cost-reimbursement contracts.

B. RESEARCH OBJECTIVES

The objectives of this research are to streamline all activities required to procure products and services for the Government of South Africa in an efficient and effective manner. Additionally this research compares the Armscor procurement system with the U.S. procurement system. The U.S. system consists of the U.S. Federal Acquisition Regulation (FAR), the U.S. Defense Federal Acquisition Regulation Supplement (DFARS) and other supplementary regulations.

C. RESEARCH QUESTIONS

1. Primary Research Question

Given Armscor's approach to evaluate contract types, the following primary research question was developed for this thesis:

What are the critical issues and problems involved in the contracts used by Armscor and how might the contracting process be enhanced through a broader use of contract types?

2. Subsidiary Research Questions

In support of this primary research question the following subsidiary questions are appropriate:

- What is the current state of the Armscor contracting system concerning contract types?
- What are the major categories of systems, goods and services that Armscor processes and what implications do these categories have for contract types?
- What are the current problems and issues that limit Armscor's procurement capability and the potential use of alternative contract types?
- What types of contracts might be suitable for Armscor?
- What changes can be incorporated into current Armscor regulations governing contract types?
- What model structure of contract types should Armscor utilize?

D. METHODOLOGY

In order to answer the primary and secondary questions, the researcher conducted a comprehensive search of available literature dealing with contract risk allocation, incentives and contractor motivation concerning contract types selection. Additionally, the researcher interviewed various personnel in the policy sections of the South African Department of Defense (SA DoD), Armscor officials and the Armscor Programme

Managers[1] (APMs) as well as DoD Program Officers[2] (POs). Interview questions are contained in Appendix A.

E. ASSUMPTIONS

The primary assumption is that the reader is familiar with the fundamental processes of Government contracting.

F. ORGANIZATION OF THE RESEARCH

This research is organized in the following manner: Chapter I contains the introduction, research objectives, questions to be analyzed, methodology and assumptions. Chapter II presents the defense structure, the background information, the defense budget, the procurement system and the definition of contract types and regulations used by Armscor. Chapter III presents generic contract types used by the U.S. Federal Government and other countries. Chapter IV presents and analyses the problems caused by using fixed–price contracts only. Chapter V provides conclusions derived from the research and proposes recommendations.

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1 An Armscor Programme Manager is a civilian Armscor employee who is authorized to enter into a contract with the industry. This person is authorized to make contract determination and findings, administer and terminate contracts. The APM also manages specific acquisition programs, coordinates defense industry contractors and consultants. The APM is responsible for the overall procurement of the contract.

2 A Project Officer is an appointed member of S.A. DoD, usually military, who is representing the Departmental Acquisition and Procurement Division on a project team. The PO is responsible for the user requirements and project funding.

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II. PRESENTATION OF REGULATIONS AND ISSUES ASSOCIATED WITH CONTRACT TYPES USED BY ARMSCOR

A. THE SOUTH AFRICAN GOVERNMENT

The world regards South Africa as one of the most outstanding examples today of how severe political, racial and ethnic differences can be resolved through negotiation and compromise. This is underscored by the crucial role South Africa plays in the political stability of southern and central Africa. It achieved independence in 1994 and is led by a President who is also the Commander in Chief of the South African National Defense Force (SANDF). The President presides over Government Ministries that include the Ministry of Defense.

B. THE MINISTRY OF DEFENSE

The Minister of Defense is accountable to the Parliament and the Cabinet leads the South African Ministry of Defense. The Parliament has legislative powers over the defense budget and reviews the President's decision to deploy the South African National Defense Force (SANDF) in critical missions.

Article 228(3) of the South African interim constitution made provisions for the formation of the Joint Parliamentary Standing Committee on Defense (JPSCD). The powers of the committee are to investigate and make recommendations regarding the defense budget, functions, armaments, policy and morale. The committee evaluates the state of preparedness of the SANDF and also performs such functions as parliamentary supervision of the force as prescribed by law. [Ref. 5]

The Minister of Defense directs and controls the performance of the defense functions through the statutory Council on Defense, while the Chief of the SANDF and the Secretary of Defense serve as co-chairmen of the Defense Staff Council. The Defense Staff Council advises the Minister on defense matters. [Ref. 5]

The constitution mandates that the Chief of the SANDF executes military command of the armed forces. This command is executed under the direction of the Minister of Defense in times of peace and under the President during a state of national defense. The Secretary for Defense manages the Defense Secretariat and is the accountable officer of the South African DoD. The Secretary for Defense is the principal advisor to the Minister on defense policy and matters that can be investigated by the JPSCD.

C. PROCUREMENT RESPONSIBILITIES

The South African DoD is responsible for selecting and approving acquisition programs at three different levels. The highest program approval level is called the Armament Acquisition Council (AAC) that approves cardinal projects. The Minister of Defense is the chairman of the Council and is charged with identifying major procurement programs and presenting them to the Cabinet and Parliament for approval. At this level, the final selection of the equipment and supplier, as well as any monetary commitments for strategically important and large projects, is undertaken.

The middle level of approval is called the Armament Acquisition Steering Board (AASB) chaired by the Secretary for Defense. This Board approves smaller projects and screens the larger projects.

The lowest level of approval is the Armament Acquisition Control Board (AACB), which is chaired by the Chief of Acquisition within the Defense Secretariat. This board screens all projects and other routine programs in terms of requirements and amendments. [Ref. 6]

D. THE PROCUREMENT AGENCY

Legislation recognizes Armscor as the Government armament procurement agency under the direct control of the Minister of Defense. [Ref. 5] DoD regards Armscor as its procurement agency, responsible for program management and contracting. The Departmental Acquisition and Procurement Division (DAPD) is that part of the DoD responsible for the execution of armament acquisition programs. [Ref. 6] According to DoD policy on acquisition, DAPD is a single nodal point between Armscor and the DoD. [Ref. 6]

Legislation defines the primary functions of the agency as acquiring defense products and services, mainly for the SANDF, and the development of the technologies required for future weapon systems. Armscor is a separate entity that has its own Board of Directors. [Ref. 4] The Minister of Defense appoints the chairman of the agency. While both the Chief of the SANDF and the Secretary of Defense serve on the Armscor Board of Directors. The main function of the Board is to broadly oversee management in terms of strategic imperatives and budget. Armscor is regarded as the "other leg"[3] of the Ministry of Defense and is responsible to the Minister. Figure 1. presents the structure of

[3] The other leg of the Minister of Defense is an expression that was used by the Ministry of Defense Spokesperson in 1982 and has been adopted by Armscor since then.

the South African Ministry of Defense as interpreted by Armscor and according to legislation.

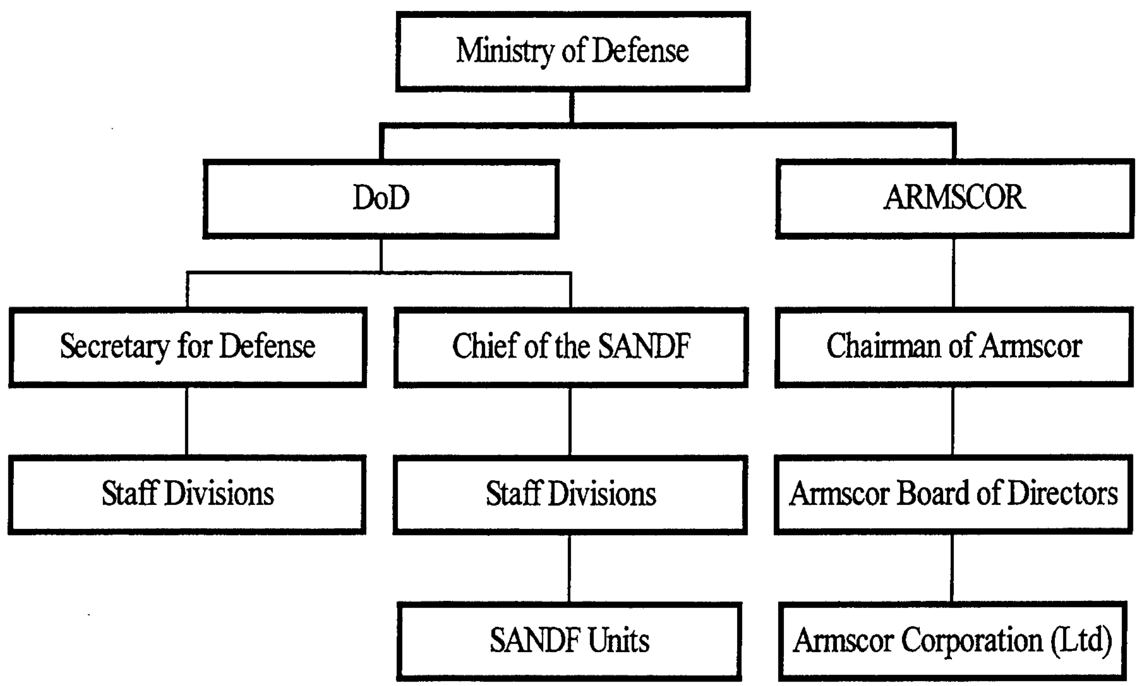

Figure 1. The South African Ministry of Defense.
Source: Developed by the researcher.

Armscor and the DoD (Defense Secretariat and the South African National Defense Force) share equal status in the Defense Review. Attendants of this review are the Chiefs of the SANDF staff for operations, logistics and finance, the Chairman of Armscor, the Armscor Chief Executive Officer and a representative from the industry defense. The Defense Review was established to ensure participation of the defense community[4] in the planning process. Industry is represented through the South African

[4] The defense community refers to the South African DoD, Armscor and the Defense related industry.

Aerospace, Maritime and Defense industries association (AMD). They represent about 95% of the country's total defense industry. [Ref. 8]

E. DEFENSE BUDGET

The South African defense budget grew ten times nominally between 1975 and 1989, from R1 billion to R9.4 billion (R – South African Rands) in constant dollar value; however, the increase was from US $3 billion per year in the early 1980s to US $3.43 billion per year in 1988 prices. Defense spending averaged 16.4 percent of the Government budget in the 1980s. According to a 1989 survey by the United States Arms Control and Disarmament Agency, South Africa ranked 13th in total military expenditures, 44th in the military percentage of the Gross Domestic Product (GDP) and 63rd in military spending [Ref.7]. The ranking come from a comparison of 144 countries.

In 1998, the total South African defense spending was reduced to less than 3% of the GDP. The defense contractors have suffered losses as a result of the reduction in the defense budget. The largest defense contractor Denel lost US $69 million in 1998. [Ref.7] Table 1 presents the South African Defense spending when compared as a percentage of GDP with its neighboring states.

Country	1994	1995	1996	1997	1998
Botswana	3.6%	3.1%	2.6%	2.9%	3.5%
Mozambique	8.8%	3.9%	3.6%	3.7%	(4.2%)
Zimbabwe	3.3%	3.9%	3.2%	3.4%	2.6%
Namibia	1.8%	2%	2.1%	2.5%	2.6%
South Africa	2.9%	2.5%	2.1%	1.9%	1.6%
Swaziland	2%	2.2%	2.2%	2.2	2.4%
Lesotho	2.8%	2.8%	2.6%	2.9%	3.2%

Table 1. Defense Budget Comparison of countries Neighboring South Africa. From: Sipri Year Book 2000, Military Expenditure Database.

F. DEFENSE REVIEW

The Defense Review is provided by the White Paper on Defense. It elaborates the defense policy framework "through a comprehensive long range planning on matters such as posture, doctrine, force design, force level, logistic support, armament, equipment human resource and funding." [Ref. 3]

The Defense Review is comprised of various specialty subcommittees. The main body is the Work Group on Defense, consisting of members of the Parliament, Defense Secretariat, the SANDF, Armscor and the Defense Industry.

The responsibility of the Defense Review is to assess various possible threats and missions making assumptions about the "warning time" or lead-time during which the SANDF can make preparations. The Review's key function is making procurement recommendations to the Minister of Defense along with assessing user requirements of the SANDF in its quarterly meetings. Armscor does not drive the weapons decisions; SANDF does this. The Agency's purpose is to convert the user requirements into concrete technical specifications and then to acquire them from industry.

G. PROCUREMENT PROCESS

The Armscor procurement process distinguishes three types of projects: cardinal projects, critical and routine. [Ref. 10] Cardinal projects are those that require interaction with international treaties, tendencies and domestic politics. These projects may be of high strategic nature, high cost and may involve high risk. Critical projects are for urgent requirements; nonetheless, some critical projects may also be classified as cardinal. Routine projects are usually non-cardinal and are for commercial products and services.

Armscor procures these products and services from the domestic industry or foreign contractors.

The agency's procurement process begins with the generation of requirements by the DoD. As soon as Armscor receives the requirements, it assigns the Armscor Programme Manager (APM). The APM registers and compiles the requirements into the Armscor financial system and sends the request for proposal to prospective offerors. If there is only one source, the APM may begin pre-award discussions even before the proposals are received. No discussions are allowed with offerors when procuring commercial products. All questions and clarification are channeled through the Armscor Procurement Division. The Armscor procurement process is illustrated in Figure 2.

When proposals are received they are subject to internal inspection before they are given to the APM. Depending on the type of project, the proposals may be assessed by an evaluation committee. The APM evaluates projects of lower value.

After making the selection, the Armscor administration officer requests financial authority from the DoD system for the value of the selected proposal. The APM compiles a submission that is approved by the relevant authority as shown in Figure 3. The submission consists of the solicitation information, offer receipt, the selection procedure and criteria, justification for the selected offers and all other related information. The APM submits the latter information to the team leader.

The team leader is one level higher than the APM. The team leader verifies, signs the submission and sends it to the respective level of approval. The contract is awarded to the responsible and responsive offeror after the committee approves the submission.

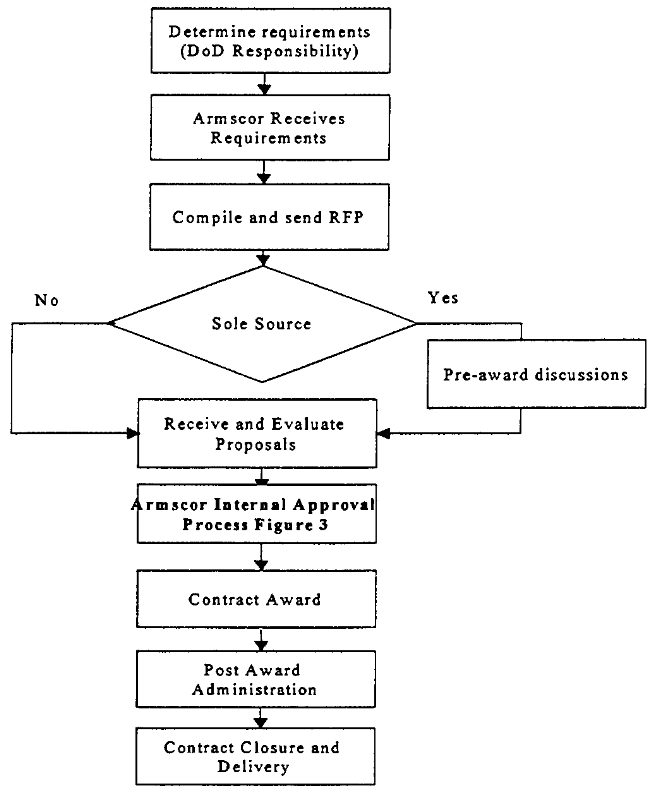

Figure 2. Armscor Procurement Process.
Source: Developed by the researcher.

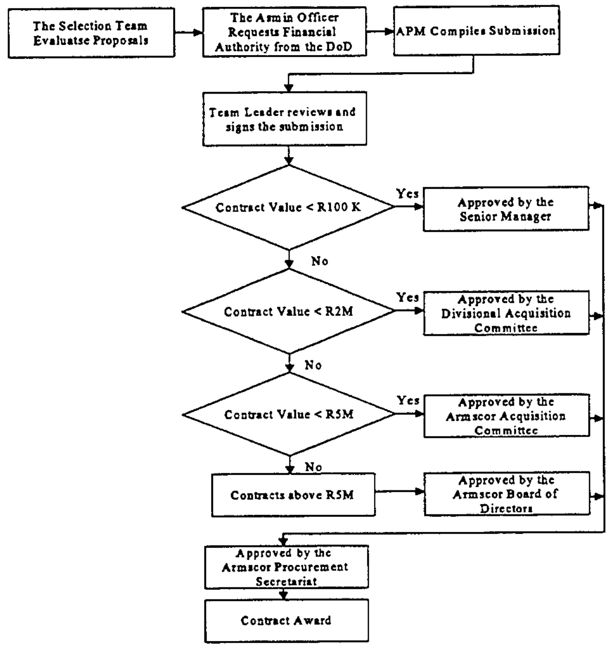

Figure 3. Armscor Internal Approval Process.
Source: Developed by the researcher.

H. KIND OF CONTRACTS

Armscor projects are further classified into complex and non-complex. Complex projects may have to go through the full acquisition process. The agency acquisition process includes the following phases: concept, design, development, production, commissioning and operations. Separate projects may also be placed for each phase. Non-complex projects usually have detailed specifications but may be distinguished according to the total expenditure.

Armscor acquires a large percentage of complex weapon systems from foreign sources. The Government of South Africa requires all international offerors to comply with an industrial participation program. This program requires the offerors to invest in

South Africa or subcontract with the domestic industry for supply of sub-systems [Ref. 12].

I. ARMSCOR CONTRACT TYPES

The Armscor regulations do not address contract types. It addresses price adjustment. There is a relationship between price adjustment and contract type, since the objective is to negotiate a contract type and price that will result in reasonable contractor risk and provide the contractor with incentives for efficiency. This research studies the Armscor process of negotiating prices as it relates to various international principles. Armscor distinguishes between two types of arrangements, "fixed-price" and "not fixed-price".

1. Fixed-Price Contract

Fixed-price means the price cannot be changed and is not subject to adjustment. [Ref. 13] Armscor uses the term "fixed-price' contracts for all contracts including the firm-fixed-price. Generally, fixed-price contracts are suitable for acquiring commercial items. Thus, when there is adequate price competition (multi-source contracting), reasonableness is determined based on previous or similar purchases. Fixed-price contracts are used when the APM can determine performance uncertainties and write a concrete detailed specification. Armscor recommends fixed-price contracts when the budget is insufficient to place a long-term contract and the APM can persuade the contractor to perform more and commit to a fixed-price and firm delivery.

2. Price is not Fixed Subject to the Rate of Exchange

This is a variant of the firm-fixed-price contract that is subject to the rate of exchange. The Armscor contracting procedure requires all offerors to detail the foreign

content of the products. The cost of foreign products is subject to the currency rate of exchange (ROE) and the Government will pay the difference when there is currency fluctuation.

This arrangement is used to reimburse contractors for the increase in costs caused by the rate of exchange fluctuation. For example the exchange rate between the South African Rand and the U.S. dollar has almost doubled since 1995. Armscor requires the contractor to submit the relevant invoices from its foreign supplier, accompanied by supporting documentation from the bankers as to when the foreign exchange was paid and the rate of exchange at which payment was affected in order to verify the particulars. [Ref. 11]

In all cases where products bought have to be imported, the contractor is not entitled to benefit and profit from any change in the rate of exchange of the currencies involved. Similarly, the contractor is not expected to bear any loss caused by a change in the rate of exchange, unless such loss is incurred as a result of the contractor's negligence or non-compliance with the provisions set out hereunder. [Ref. 12]

3. Price is not Fixed Subject to Escalation

This type of contract allows economic price adjustment by using a formula. This contract type resembles the fixed-price-economic price adjustment that is used by U.S. Federal procurement agencies. The description of the price adjustment is illustrated by the following formula:

$$P1 = Po\left(a + b\,\frac{My\text{-}z}{Mx} + c\,\frac{Ly\text{-}z}{Lx} + d\,\frac{Ohy\text{-}z}{Ohx}\right) \qquad \textbf{Formula 1}$$

Where:

Po = contract price before adjustment (minus foreign content and / or advanced payment)

P1 = contract price after adjustment

M = direct material index as published by for month x and y

L = direct labor index as published for month x and y

Oh = indirect cost index, including indirect material, indirect labor and other overhead costs

The contractor is allowed to use more than one index for the applicable cost categories if no suitable single index representative of the direct material, direct labor or indirect costs exist.

a = percentage of Po not subject to cost contract price adjustment

b = percentage of Po representing direct materials

c = percentage of Po representing direct labor

d = percentage of Po representing indirect costs

x = base date of indexes, to be taken on the date the quotation is prepared

y = contractual or actual date of delivery, whichever is the earliest

z = period in months prior to contractual delivery date in which the contractor planned the respective costs to be occurred [Ref. 12]

Of note, Armscor only incorporates independent indices into its price arrangements that contractors cannot directly or indirectly influence or control.

Armscor uses this type of arrangement when the cost of the contract is R100,000 ($13,000) and above and/or the delivery period is over six months. It is also applied when

the Armscor contractor cannot estimate the contract price with certainty and when Armscor acquires major defense systems that are deliverable in more than one year.

J. CHAPTER SUMMARY

This chapter provides a general description of the regulations and procedures followed by the Republic of South Africa. It presents all stakeholders in the defense procurement and their responsibilities. The chapter also presents contract types used by Armscor.

The next chapter will present contract types used internationally. Special focus is placed on the U.S. Federal Acquisition Regulation System and contract types utilized by the U.S. Department of Defense.

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III. GENERIC CONTRACT TYPES USED BY THE U.S. FEDERAL GOVERNMENT

A. INTRODUCTION

This chapter describes the U.S. Federal Acquisition System, generic contract types used by the U.S. Federal agencies and the U.S. DoD.

B. THE U.S. FEDERAL ACQUISITION REGULATION SYSTEM

Defense procurement in the United States (U.S.) is done under the auspices of the Armed Services Procurement Act (ASPA) of 1949. This Act has been amended several times since then. One significant amendment was done in 1984 with the introduction of the Competition in Contracting Act (CICA) [Ref. 14]. Other amendments to the Act were the Federal Acquisition Streamlining Act (FASA) of 1994 and the Clinger-Cohen Act of 1996 [Ref. 14]. The U.S. Congress provides a single regulation that covers all U.S. Government agencies called the Federal Acquisition Regulation (FAR), which is written by the Federal Acquisition Regulatory Council. The Council consists of the Administrator of Federal Procurement Policy, the Secretary of Defense, the Administrator of National Aeronautic and Space Administration, and the Administrator of the General Services Administration. All of the major agencies with procurement authority issue supplementary regulations to assist with implementation of the FAR.

The U.S. Department of Defense (DoD) issues a supplement to this regulation called the Defense Federal Acquisition Regulation Supplement (DFARS). The FAR and all its supplements are known as the Federal Acquisition System (FAR System) developed under the Office of Procurement Policy (OFPP) Act of 1974. The predecessor

regulation included the Defense Acquisition Regulation (previously developed under the authority of the ASPA), and the Federal Procurement Regulation, which are based on the Federal Property Regulations and Administrative Services Act of 1949. The FAR System was established for the codification and certification of uniform policies and procedures for acquisition by all executive agencies. [Ref. 14]

The FAR defines contract types authorized for use by the U.S. Government and classifies them into two basic types, fixed-price and cost-reimbursement. The term "contract type" refers to the method provided in the contract for compensating the contractor for supplies and services provided to the Government. [Ref. 14] The FAR also provides eleven factors that need to be considered in selecting the appropriate contract type. [Ref. 15]

C. CONTRACT TYPE SELECTION FACTORS

Selecting the proper contract type requires sound judgment. The objective is to negotiate a contract type that fairly allocates performance risk between the contractor and the Government while incentivizing the contractor to perform effectively and economically. In order to achieve the latter, the following factors need to be considered [Ref. 14].

1. Acquisition History

Contractor risk usually decreases as the requirement is repetitively acquired. Also, product descriptions or description of services to be performed can be defined more clearly.

2. Price Competition

A procurement action should be competed whenever possible. Effective competition normally facilitates reasonable prices, especially if a fixed-price contract can be used.

3. Price Analysis

Price analysis, with and without competition, is a process by which the contracting officer analyses proposed prices to determine reasonableness. It includes comparing prices with historical prices, market prices and other competitive quotes.

4. Cost Analysis

Cost estimates provide the offeror and the Government with the basis for negotiating a contract-pricing arrangement in the absence of price competition. Cost analysis involves the evaluation of the offeror's cost and pricing data. These data are analyzed to determine the reasonableness, allowability and allocability of costs and the basis of cost estimates.

5. Type and Complexity of the Requirement

The contracting officer assesses the degree of risk assumed by both the offeror and the Government. Unique, unstable and complex Government requirements usually result in greater risk assumption by the Government.

6. Urgency of the Requirement

If urgency is a factor, the contracting officer may choose to give the contractor some incentives to meet the desired delivery schedule or assume a greater proportion of the cost risk.

7. Period of Performance or Length of Production Run

Some contracts extend over a long period of time and may require economic price adjustment. This may be applicable in times of economic uncertainty.

8. Contractor's Technical Capability and Financial Responsibility

The Government must establish the offeror's performance capability and financial health prior to contract award.

9. Adequacy of the Contractor's Accounting System

Before the Government contracts using contract types other than fixed-price-type, the contracting officer should ensure that the contractor's accounting system will permit timely development of all necessary cost data in a form required by the proposed contract type.

10. Concurrent Contracts

If the offeror holds other Government and/or commercial contracts, the contracting officer must determine what impact these contracts will have on the proposed contract.

11. Extent and Nature of Proposed Subcontracting

The contracting officer should assess subcontracting by the prime contractor when selecting the appropriate contract type that reflects the actual risk.

D. TYPES OF CONTRACTS

The two main contract types are the fixed-price and the cost-reimbursement contracts. Fixed-price contracts involve substantial risk for the contractor while cost-reimbursement contracts place very little risk on the contractor [Ref. 16]. Fixed-price contracts are appropriate for products and services that are objectively defined in the

solicitation and for which the risk of performance is manageable. For such acquisitions, performance-based statements of work, measurable performance standards and surveillance plans are ideally suited. The contractor aims to find improved methods of performance in order to increase its profits. In comparison, cost-reimbursement contracts are appropriate for products and services that are only defined in general terms or for which the risk of performance is not reasonably manageable.

Fixed-price contracts include Firm-Fixed-Price (FFP) contracts, fixed-price contracts with economic price adjustment (FPE), fixed-price contracts with prospective price redetermination (FPRP), fixed-price contracts with retroactive price redetermination (FPRR) and firm-fixed-price, level-of-effort term contracts (FP-LOE), fixed-price incentive firm target (FPIF) contracts, fixed-price incentive successive targets (FPIS) and fixed-price-award fee (FPAF) contracts.

Cost-reimbursement contracts include Cost-No-Fee (CNF), cost-sharing (CS), cost-plus-fixed-fee (CPFF), cost-plus-incentive-fee contracts (CPIF), cost-plus-award-fee (CPAF) and the award term (AT) contracts. Award term contracts are a derivative of the Award fee contracts used in performance based contracting.

Fixed rate contracts exhibit both fixed-price and cost-reimbursement characteristics and include the Time-and-Material (TM), the Labor Hour (LH), Definite-Quantity and Indefinite Quantity Contracts.

Cost-reimbursement contracts are utilized when the buyer will assume greater risk of performance, while fixed-price contracts represent the contractor's assumption of risk. Figure 4. below illustrates the risk continuum for contract types.

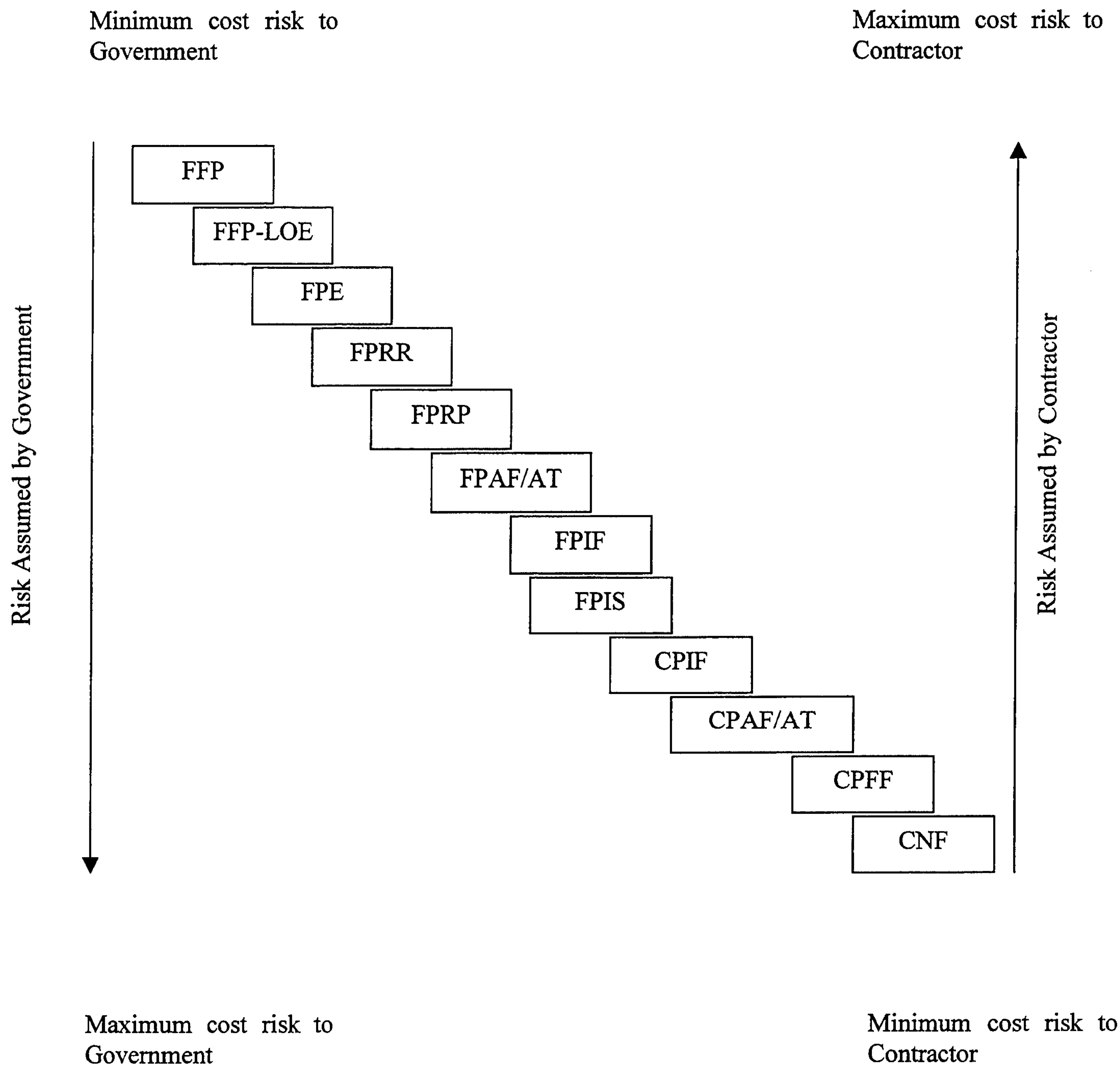

Figure 4. Contract Type Risk Continuum.
Source: Designed by the researcher

1. Fixed-Price Contracts

Under a fixed-price contract, the contractor agrees to provide a product or accomplish specific work for a pre-set price. The contractor should, therefore, be very careful in pricing such work. The contractor should take into account potential cost increases caused by inflation, material shortages, or difficulties in meeting performance requirements, particularly if the contract contains options. Options give the Government the right to require the contractor to perform additional work at agreed to prices.

a. Firm-Fixed-Price Contracts

The Firm-Fixed-Price (FFP) contract is an agreement to pay a specified price for delivery of specific products and services. The FFP contract provides for a price that is not subject to any adjustment on the basis of the contractor's cost experience in performing the contract. With this type, the price is firm for the duration of the contract and the only adjustments made are authorized changes. Under this type of contract, the contractor can receive the maximum profit and assume the maximum risk of profit or loss. The contractor also assumes the risk of unexpected costs, such as those that might result from inflation, material shortage, etc. [Ref. 16].

The FFP is the preferred contract type because of its minimal administrative burden on both parties and the maximum incentives for the contractor to control costs and perform effectively. The FFP contract also allows accurate monetary obligation.

This type of contract is not recommended where costs cannot be estimated accurately because the contractor may include contingencies in its price proposal to cover the performance risk, thus raising the price of the contract.

FFP contracts are generally used when there is adequate competition, the costs of performance are reasonably predictable and when adequate, functional or detailed specifications are available. Such contracts are particularly suitable for standard or modified commercial items and previously purchased military items where past performance permits prediction of costs. An illustration of FFP contract is demonstrated in Figure 5 of Appendix B.

b. Fixed-price with Economic Price Adjustment Contracts

Fixed-price with economic price adjustment (FPE) contracts protects the Government and the contractor against wide fluctuations in labor or material costs when market conditions are unstable. This type of contract provides for adjustment of the contract price for increases or decreases from an agreed-upon level measured against published or established prices of specific items: specified costs of labor and material actually experienced during performance, specified labor or material cost standards or indexes, such as the producer price indexes. The contract is adjusted only if the price levels specified in the contract change. Frequently, the contract will contain a ceiling price beyond which the Government will not pay, no matter what the cost increases may be [Ref. 17]. Additionally, the contract may specify a minimum movement in the price to trigger a price adjustment.

These types of contracts are used when there is serious doubt about the stability of market or labor conditions that could exist during an extended period of contract performance, and when any contingencies that would otherwise be included in the contract price are identified and covered separately in the contract. [Ref. 18] The FPE contract is illustrated in Figure 6 of Appendix B.

c. *Fixed-Price with Price Redetermination Contracts*

There are two types of fixed-price with price redetermination contracts: the fixed-price with prospective price redetermination and the fixed-ceiling-price with retroactive price redetermination.

(1) Fixed-Price with Prospective Price Redetermination Contract Under a Fixed-Price with Prospective Price Redetermination Contract (FPRP). The Government pays a fixed-price for goods or services, but the price is subject to revision at stated times during performance of the contract. At the time of redetermination, the contractor submits a proposal based on actual costs of performance and the estimated cost of any incomplete work. After a Government audit, the contractor negotiates a revised price, which could be higher or lower than the initial price but cannot exceed the ceiling price.

A FPRP contract is used in the acquisition of products or services for which it is possible to negotiate a fair and reasonable Firm-Fixed-Price for an initial period, but not for subsequent periods of contract performance. The initial period is usually the longest period possible to negotiate a fair and reasonable firm-fixed-price. Each subsequent period should be at least 12 months. [Ref. 14] FPRP contract is illustrated in Appendix B.

(2) Fixed-Ceiling-Price With Retroactive Price Redetermination Contract. A Fixed-ceiling-price with retroactive price redetermination (FPRR) contract provides for a ceiling price and retroactive redetermination after completion of the contract. [Ref. 14] Therefore the Government pays a fixed-price for goods or services, subject to a price ceiling, that is negotiated after the contract

performance. A FPRR is applied when a fair and reasonable price and firm-fixed-price cannot be negotiated for the initial period of performance, therefore rendering other types of contracts impracticable. In the U.S., the FPRR contract is restricted to R&D effort estimated to cost less than $100,000. [Ref. 20] Appendix B illustrates the FPRR contract.

d. Fixed-Price Level Of Effort Contracts

Under a Fixed-Price Level of Effort (FFP-LOE), the contractor is required to provide a specified level of effort, over a stated period of time, for work that can only be stated in general terms with the Government paying the contractor a fixed amount. [Ref. 15] In this contract type the Government assumes all the risk for completion of performance. The financial risk to the contractor is minimal since payment is based on the level of effort and not on the results achieved. This contract type is appropriate for investigation or study in a specific R&D area. The product of the contract is usually a report showing the results achieved through application of the required level of effort. [Ref. 14] An example of the FFP-LOE is illustrated in Appendix B.

Firm-Fixed-Price contracts and Cost-Plus-Fixed-Fee contracts are the extremes of the contract compensation arrangements, since in either case the responsibility of cost falls primary on only one party. In between the two extremes are a number of contracts in which the responsibility of cost is shared between the contractor and the Government. These are called incentive type contracts. [Ref. 16] The Government applies incentives on contracts in an attempt to motivate the contractor to improve performance in cost, schedule or other stated parameters. The two basic types of incentive arrangements are the incentive fee contract and the award fee contract. The

incentive fee contract types consist of the Fixed-Price Incentive (FPI) contract and the Cost-Plus-Incentive-Fee contract (CPIF).

e. Fixed-Price-Incentive Contracts

The FPI contracts include two types: the Fixed-price Incentive Firm Target (FPIF) and the Fixed-Price Incentive Successive Targets (FPIS).

(1) Fixed-Price-Incentive with Firm Target Contracts. The FPIF contracts allow the contract elements to be negotiated from the outset using a target cost, target profit, ceiling price and sharing formula.

The FPIF contract is applied where the firm-fixed-price contract is not suitable. It is also used when assumptions of the degree of responsibility of cost by the contractor provides incentive for effective cost control. This contract type can be combined with the performance and the schedule incentives. A FPIF contract is appropriate when the parties negotiate, at the outset a firm target cost, target profit, and profit adjustment formula establishing a fair and reasonable incentive and ceiling that requires the contractor to assume an appropriate share of the risk. When the contractor assumes a considerable or major share of the cost responsibility under the adjustment formula, the target profit should reflect this responsibility. [Ref. 20] Figure 7 of Appendix B exhibits this type of contract.

The price the Government pays is the sum of the negotiated cost and the final profit. The final profit is determined by comparing the final negotiated cost to target cost and adjusting target profit in accordance with the share ratio formula. The final price cannot exceed the ceiling price.

(2) Fixed-Price-Incentive With Successive Target Contracts. Fixed-Price-Incentive with Successive Target contracts specifies the following elements: initial target cost, initial target profit, initial target profit formula, ceiling price and target profit adjustment formula. At a given predetermined production point, the firm target cost is negotiated and the firm target profit is determined in accordance with the formula. After the latter adjustment, the parties may either negotiate a firm-fixed-price or a firm-fixed-price with firm target contract.

A fixed-price incentive contract is similar to a redetermination contract. The difference is that a fixed-price incentive contract contains a target cost, a target profit, a price ceiling, and a formula by which the Government and contractor share any differences between target costs and actual final costs, as negotiated. The formula rewards the contractor with more profit if final costs are less than the target cost, and it takes profit away if final costs exceed the target. For example, a typical sharing arrangement would be one whereby the Government keeps 80 percent of the savings and the contractor retains the remaining 20 percent. Similarly, if final costs were higher than the target cost, the Government pays 80 percent of the excess costs, and the contractor has to bear 20 percent of the excess costs as a reduction of profit. An infinite variety of sharing arrangements is possible, however the contractor cannot be paid more than the ceiling price. [Ref. 14] Figure 8 of Appendix B illustrates the FPIS and the point of total assumption (PTA). The PTA is the point at which $1 more of incurred cost equals $1 reduction in profit. It is the point at which the share formula converts the contract to a firm-fixed-price.

A FPIS contract is applied where the firm-fixed-price contract is not suitable. It is appropriate when the available cost and pricing data is not sufficient to permit the negotiation of a realistic firm target cost and profit before the award. A FPIS requires that sufficient information be available for parties to negotiate initial targets and a reasonable assurance that additional reliable information is available at an early point in the contract performance. This permits negotiation of either a firm-fixed-price or a firm target and a formula for establishing the final profit and price providing a fair and reasonable incentive. This additional information is not limited to experience under the contract, itself, but may be drawn from other contracts containing the same or similar items. [Ref. 10]

f. Award Fee Contracts

The interim type of incentive contracts, award fee and award term contracts, are based on performance of the contractor. These types of contracts give the contractor the freedom to utilize its talents and expertise in performing the job economically, efficiently, and effectively, using the latest techniques and innovations.

This method of contracting is called Performance-Based Contracting (PBC). Generally, a PBC contracting arrangement fits well for function or performance specifications. The ability to use PBC with specifications based on essential physical characteristics often depends on the amount of freedom the contractor has in making meaningful choices versus the level of design details provided.

Award fee contracts are used either with fixed-price, or cost-reimbursement contracts pricing arrangements. The two types of award fee contracts are Fixed-Price-Award-Fee (FPAF) and Cost-Plus-Award-Fee Contracts (CPAF). The award

fee contract represents a middle ground of the cost risk continuum; from a contractor's cost risk standpoint, it lies between fixed and cost-plus-fixed-fee pricing arrangements.

Before selecting an award fee contract, the contracting officer should perform a cost benefit analysis of the expected benefits versus the added administrative costs. The value added to the program by using an award fee type contract must be greater than the costs to administer it. This exercise is valuable especially in light of full cost accounting, where the administrative cost of managing a contract is visible and charged to the program it supports.

Administrative costs are calculated using the grade levels and hours required to monitor, evaluate, brief and implement the award fee process. Award Fee contracts are distinguished as follows:

(1) Fixed-Plus-Award-Fee Contracts. Fixed-Price-Award Fee (FPAF) contracts consist of two parts; firstly, the firm-fixed-price part of the contract in which the contractor is obliged to perform at the time, place and fixed-price in the contract. The second part entails the award fee, which may be considered an opportunity for the contractor to earn an additional fee by satisfying more than the minimum performance requirements.

This type of contract requires the contractor's performance to be periodically evaluated against a given objective or subjective award fee criteria. The contractor has the opportunity to earn 100 percent of the available award fee set aside for the period of performance. The contractor is motivated to minimize costs because under the FFP portion of the contract, an additional amount of profit for performance is realized

under the annual fee portion of the contract. Additionally the contractor may earn an additional fee for exceeding minimum performance standards.

The FPAF contract is used when the Government wishes to motivate the contractor in managing performance areas. This contract type can be used to incentivize performance objectives in logistics support, timeliness and quality. Several agencies do not use the base fee on fixed-price award fee contracts. This is because it assumes that the contractor has already received the profit level built into the fixed-price. Small business contractors in the U.S. prefer base fees because it improves cash flow.

2. Cost–Reimbursement Contracts

The next category is the cost-reimbursement contract in which the Government reimburses the contractor for all allowable, reasonable and allocable incurred costs of performing the contract. The contractor's cost accounting practices must meet commonly accepted standards and be open to the Government. Under cost-type contracts, the contractor is obliged only to provide its "best efforts." In most cases, neither performance nor delivery is guaranteed. Although, there are several different types of cost-reimbursement contracts, all have a common feature: the obligation to perform the work ceases when the contractor's costs of performance equal the funds provided under the contract. [Ref. 14]

a. Cost-No-Fee Contracts

A Cost-No-Fee (CNF) contract is a cost-reimbursement contract in which the contractor receives no fee. This type of contract is appropriate for Research and Development (R&D) work, particularly with educational institutions or non–profit

institutions, and for facilities contracts. [Ref. 20] To use this contract type the contracting parties should agree on target cost. Appendix B describes the CNF with an example.

b. Cost-Sharing Contracts

This type of contract provides for the Government to pay only a portion of allowable cost as mutually agreed by the contracting parties. The contractor absorbs a portion of the cost with expectations of gaining benefits outside of the instant contract. The Government and the contractor agree on an estimated cost. This type of contract is utilized for R&D with either profit or non-profit organizations and contractors.

c. Cost-Plus-Fixed-Fee Contracts

A Cost-Plus-Fixed-Fee contract (CPFF) contract, one of the simplest types, entails the contractor and the Government agreeing on the allowable cost of contract performance and a fixed fee (profit) that the contractor receives for doing the work. The contractor receives the same fee, regardless of whether the contractor's actual costs are greater or lesser than the estimated cost. [Ref.14]. This type of contract offers minimum incentive for the contractor to control costs.

A CPFF contract is chosen when the Government cannot get a more favorable arrangement or when the presence of great uncertainty and risk would result in the inclusion of a large contingency in a firm-fixed-price contract. This contract type is also appropriate in circumstances where the technical and schedule risks are so high that the cost risk is too large for the contractor to assume. The CPFF is designed for use in research or preliminary exploratory development when uncertainty of performance is very high. Figure 9 in Appendix B exhibits this contract type.

d. Cost-Plus-a-Percentage-of-Cost Contracts

The Cost-Plus-a-Percentage-of-Cost (CPPC) contract provides the contractor with a reimbursement for cost incurred, plus a fixed percentage of those costs as profit. Since the contractor's profit is in direct proportion to the cost incurred, there is a positive incentive for the contractor to drive up the cost.

The U.S. Federal law prohibits the use of CPPC contracts in U.S. procurements because the contractor can continuously increase costs in order to receive more profit. Figure 10 in Appendix B exhibits this contract type.

The price the Government pays is the sum of the negotiated cost and the final profit. The final profit is determined by comparing the final negotiated cost to target cost and adjusting target profit in accordance with the share ratio formula. The final price cannot exceed the ceiling price.

e. Cost-Plus-Incentive-Fee Contracts

In the Cost-Plus-Incentive-Fee (CPIF) contract, the Government and the contractor agree on a target cost, a target fee, and a sharing formula for determining the final fee. The formula accommodates an adjustment in the fee, based on any difference between the target cost and the total allowable cost of performing the contract. Unlike the fixed-price incentive contract, however, the contract sets both a minimum and maximum limit on the fee adjustment. [Ref. 20] The range of fee and fee adjustments is negotiated to give appropriate weight to basic procurement objectives. A graphic illustration of CPIF is demonstrated in Figure 11 of Appendix B.

A CPIF contract is appropriate when a given level of performance is desired and confidence in achieving that performance level is reasonably good but only when technical and cost uncertainty is excessive for the use of fixed-price incentive. This type of contract is utilized for development and test programs when a profit incentive is likely to provide motivation for more effective management. To implement this type of contract, the contracting parties negotiate the target cost, target fee, sharing formula, minimum fee and maximum fee.

f. Cost-Plus-Award-Fee Contracts

A Cost-Plus-Award-Fee (CPAF) contract provides for a base fee (which may be zero), reimbursement of allowable contractor costs and an award fee. The contractor earns a base fee that does not vary with performance with all or part of the award fee based on objective or subjective evaluation of the contractor's performance by the Government. The Government evaluates the contractor's performance in such areas as quality, timeliness, ingenuity, and cost-effective management. [Ref. 17]

The Government determines the award fee unilaterally according to the award fee criteria stated in the contract. The Government may unilaterally adjust the criteria over the course of contract performance. Today, these types of contracts are the most commonly used vehicles by the National Aeronautic and Space Administration (NASA). In other agencies, award fee contracting is increasingly used when the procuring activity wants to incentivize contract performance. [Ref. 17]

An Award fee can be used in conjunction with other types of contracts. CPAF contracts are subject to an adequate contractor accounting system and Government surveillance to ensure cost control.

The negotiated elements of this contract type are estimated cost, base fee and award fee and award criteria. The base fee is paid on a regular basis and not tied to any evaluation of service.

g. Award Term Contracts

An award term is defined as an extension of the contract period for performance earned by the contractor for rendering excellent performance. The contractor has the ability to earn an extension of a contract with the Government depending on its continuing need for the products and services and the availability of funds. This type of incentive can be best described as a modified award fee, since it has process characteristics associated with award fee provisions. [Ref. 18]

Instead of awarding the contractor a fee, the contractor has the opportunity to earn additional periods of performance. The Government appoints a team of project evaluators who assess the contractor's performance after every given period. The contractor's cumulative score may lead to an increase or reduction in the contract performance period.

The Government needs to perform a cost benefit analysis to determine the total benefits of the award term. The study includes project performance benefits, as well as the costs associated with performance and administration.

The benefits of using an award term include facilitating process improvements and capital investments, lowering contract prices and reducing the manpower intensive effort of reacquiring the services or supplies provided. Both the customer and the contractor benefit from award term as it rewards quality contractors.

Award Term contracting provides an added benefit through a successful, long-term contractual relationship communicating with the contractor through continuous and in-depth performance assessments.

Award Term is regarded as an innovative method of providing best value contracts to Government customers. The concept builds on the benefits provided by competitive acquisitions as contractors are encouraged and, in fact, rewarded for continuously providing good value and making investments and improvements that they might not otherwise make with a shorter-term contract. Although this concept is relatively new, it should be given consideration when the Government develops its acquisition strategy.

3. Other Types of Contracts

The final category of contracts types includes, time-and-materials and labor-hour, contracts, indefinite-delivery contracts, definite-quantity contracts, indefinite-quantity contracts and ordering.

a. Time-and-Materials Contracts

Another contract type frequently used by the U.S. DoD is the time-and-materials (T&M) contract. Under this type of contract, the contractor negotiates a fixed hourly rate for direct labor. That rate includes all appropriate wages, overhead, general and administrative expenses, and profit. The contractor is reimbursed at the fixed rate for each labor hour worked on the task. Any material costs incurred in performing the work are reimbursed at actual cost, including, if appropriate, material handling costs.

The time-and-materials contract is used when it is not possible to estimate the extent or duration of the work, especially in cases of repair, maintenance, or overhaul work. [Ref. 14]

b. Labor Hour Contracts

A labor-hour (LH) contract is a variant of the time-and-materials contract type. It differs only in that the contractor does not supply materials.

c. Definite-Quantity Contracts

A definite-quantity contract provides for delivery of a definite quantity of specific products or services for a fixed period, with deliveries or performance to be scheduled at designated locations upon order. A definite-quantity contract may be used when it can be determined in advance that a definite quantity of products or services will be required during the contract period and the supplies or services are regularly available or will be available after a short lead time. [Ref.14]

d. Indefinite Quantity Contract

An indefinite-quantity contract provides for an indefinite quantity, within stated limits, of products or services during a fixed period. The Government places orders for individual requirements. Quantity limits may be stated as number of units or as dollar values. The contract must require the Government to order and the contractor to furnish at least a stated minimum quantity of products or services. In addition, if ordered, the contractor must furnish any additional quantities, not to exceed the stated maximum. The contracting officer should establish a reasonable maximum quantity based on market research, trends on recent contracts for similar products or services, survey of potential users, or any other rational basis. To ensure that the contract is binding, the minimum

quantity must be more than a nominal quantity, but it should not exceed the amount that the Government is fairly certain to order. [Ref.14]

E. THE USE OF INCENTIVES BY THE U.S. DoD

In 1988, the U.S. DoD awarded 78.6% of fixed-price contracts and 19.5% of cost-reimbursement contracts. The remaining 1.9% was for other types of contracts. The fixed-price incentive contracts accounted for 16.4%; the cost-reimbursement incentive fee contracts were 2.6% while the award fee contracts amounted to 4.2%. In total, incentive and award fee contracts amounted to 23.2%. [Ref. 10]

There was a slight decrease in the use of fixed type contracts and the incentive contracts in 1999. In the past eleven years, the fixed-price incentive and the cost-reimbursement contracts have decreased from 19% to 8.3%; while, the award fee contracts have increase from 4.2% to 14.4%. These data is presented in Table 2.

Contract Type	Amount	Sub Total	1999	1988
Fixed-Price		**$70,186,947**	**61.5%**	**78.6%**
Firm	58,356,809		51.1	54.8
Redeterminable	379,314		0.3	0.1
Incentive	6,067,413		5.3	16.4
EPA	5,383,411		4.7	7.3
Cost-Reimbursement		**43,971,103**	**38.5**	**19.5**
No fee	2,626,815		2.3	2.0
Fixed Fee	16,948,294		14.8	10.8
Incentive Fee	3,406,467		3.0	2.6
Award Fee	16,398,678		14.4	4.1
Other	4,590,849		4.0	1.9
Total Obligations	**$114,158,050**	**$114,158,050**	**100%**	**100 %**

Table 2. Breakdown of Contract Types Awarded by the U.S. DoD.
Source: Department of Defense Contract Awards Fiscal 1999, and DoD Prime contract Awards, Fiscal Year 1988, United States Government

F. CHAPTER SUMMARY

This chapter introduced the U.S. Federal Procurement System, generic contract types used by the U.S. Federal agencies and the U.S. DoD.

The next chapter will discuss and analyze problems in the Armscor contracting regulations, the South African DoD and the contracting practices and policies, which affect contract types used by Armscor.

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IV. PROBLEMS CAUSED BY CONTRACT TYPES AT ARMSCOR

A. INTRODUCTION

This chapter analyses the problems in Armscor and the South African Department of Defense, with regard to contracting procedures and contract types.

B. SOUTH AFRICAN GOVERNMENT PROCUREMENT REGULATIONS

The South African Government makes laws that govern procurement of different products and services for all its agencies. These laws differ from one Service to another. For example, the Armscor Act mentioned in Chapter I authorizes Armscor to be the state procurement agency of the South African National Defense Force. The Government does not generate regulations for procurement, but allows every agency to write its own regulation; therefore, the contracts with the private sector are between the agency and the specific contractor.

The biggest contracting agency is the State Tender Board that acquires products and services for most Government departments. The law requires Armscor to advertise all solicitations on the State Tender Bulletin. Since Armscor is the second biggest and most efficient contracting agency, the South African Police Service and the Correctional Services acquire some of their products and services with the help of Armscor. Ninety percent of contractors interviewed through this research feel that allowing each agency to have its own acquisition regulation complicates the tender process. They claim that they spend more time interpreting contract conditions than focusing on the requirement satisfaction. Small and medium-sized contractors share these same sentiments. This problem is regarded as one of the causes for reduced competition in Armscor contracts.

C. ARMSCOR MANDATE AND RESPONSIBILITY

Armscor is a Government agency operating under the Ministry of Defense. It was created to support the activities of the South African National Defense Force as stated in Chapters I and II. It is the primary Government project management agency in South Africa being internationally recognized as the project management agency. The agency's labor force consists of about 600 engineers, specialists, accountants and administrators. The law calling for the formation of the agency was created, among other reasons, to strengthen the South African military in the wake of eminent attacks from liberation movements and to act as a sanctions buster since the country was under United Nations sanctions. The South African Government has been seeking ways to transform the organization in keeping with the new changes in the Department of Defense.

Legislation defines Armscor as the direct responsibility of the South African Minister of Defense, while the DoD regards the agency as its direct responsibility. Neither the Government nor Armscor have found a common ground on which to write new legislation governing the defense procurement agency. On the other hand, the Secretary of Defense has gone ahead and written its procurement policy with Armscor reporting to them. The Armscor regulation, meanwhile, is based on the old legislation, which gives the agency and the DoD equal powers. (See Table 1.) Armscor policy documents still use a quote that was made by the Ministry of Defense spokesperson in 1982 that said, " *... Armscor as the other leg of the Ministry of Defense responsible to the Minister"*. [Italics by researcher: State Security in South Africa] This statement was probably true at the time Armscor was formed. Today, the former members of the liberation movement lead the Ministry of Defense and the Government.

The Government is looking for the best way to align the agency without loosing quality people currently employed by the agency. The Minister of Defense still appoints the agency's Chairman, CEO and Board of Directors, but decisions on procurement are the responsibility of the Secretary of Defense. The Chief of Acquisition (COA) heads the Departmental Acquisition of Procurement Division of the Secretary of Defense and champions the procurement agency's activities. The COA operates at the same level as the Chiefs of the Army, Navy and Air Force receiving all the requirements and requests for funding from the Services through the Secretary of Defense. Once these requirements are approved and funding is made available it is sent to Armscor to solicit products and services.

D. QUESTIONNAIRE RESPONSES

The researcher interviewed South African APMs and DoD personnel. As a result of these interviews, the following problems relating to the Armscor contract types were discovered.

1. Contract Types

The respondents were asked to select contract types that are used by Armscor from an attached list in Appendix B. The list included detailed descriptions of each of the contract types recommended by the FAR and other international contracting agencies.

Eighty percent of the respondents said that Armscor uses the firm-fixed-price, fixed-price with economic price adjustment, time and material, labor hour, fixed- price incentive and cost-plus-fixed-fee contracts. Interesting enough, twenty percent of the respondents were either not sure of contract types or said that the agency uses predominantly cost-type contracts. From this it is evident that Armscor uses more

contract types than those written in the Armscor contract regulations described in the study. Ninety-five percent of the respondents were the Armscor Programme Managers, 2 percent were Armscor Senior management and 3 percent were from the South African Department of Defense.

2. Number of Contracts

The respondents were asked to state the total number of contracts placed by Armscor annually. They were also asked to distribute these numbers according to the contract types they could recognize.

None of the respondents answered this question. The reason for no-response is that the Armscor database for awarded contracts is not available to the public and does address contract types.

3. Interpretation of the Regulation

The respondents were asked if they could identify some Armscor regulations, laws, policies or guidelines that address contract type selection.

Fifty percent of the respondents were positive about this question but could not state the name of the regulation addressing contract type. Twenty-five percent did not know such regulations, while the rest said no such regulation exists. This issue prompted the researcher to conduct further interviews with the APMs because of the even-percentage distribution. The respondents were questioned on issues relating to the eleven contract type selection factors. The interview responses can be summarized as follows:

a. Price Competition

Armscor has not been successful in introducing competition in its traditional sole source contracts. As a result, some sole source contractors are so

confident with the Armscor business that they are not applying better cost-saving methods of delivering products and services. This point was eminent in interviews with most of the APMs. These APMs should encourage and incentivize these contractors to look for better low risk methods of delivering products and services. Introducing competition will reduce contracting risk and the burden of contractors depending on the agency.

b. Price Analysis

The results of interviews have indicated that the Armscor contracting regulation does not give enough guidance for conducting price analysis. In most cases it is enough for contractors to submit invoices from their sub-contractors as proof of purchase price; however, no further details are requested to prove allowability of these costs. Allowability is defined in Appendix D of this research. The agency mainly considers reasonableness as a risk mitigation factor, but does not require the contractors to certify the submitted invoices showing how incurred costs are allocated. By introducing the conditions for acceptable cost or pricing data, the agency will benefit by contacting on low contract risk and the ability to accurately estimate the contract costs.

c. Cost Analysis

The responses to interviews verified that even though the agency's regulations do not address cost analysis in detail, most APMs consider this factor when contracting especially with sole source contractors and for complex projects. The results of this are the decision to contract on a fixed-price basis subject to a price adjustment formula. As a result of the above analysis, the APMs are not sufficiently equipped with guidelines on contract types other than fixed-price type. Cost analysis is a function of

more accurate cost estimates that provide the offeror and the Government with the basis for negotiating a contract-pricing arrangement in the absence of price competition. Cost analysis involves the evaluation of the offeror's cost and pricing data. These data are analyzed to determine allowability and allocability of costs and the basis of cost estimates. According to some APMs, Armscor determines reasonableness by evaluating invoices for material ordered from subcontractors. The problem with this process is that it is difficult to determine whether contractors are overcharging the Government. There is also another possibility that some contractors may collude with subcontractors by submitting high invoices. Armscor should develop a policy on allowable cost, which addresses the above problems. An allowable cost is any cost that can be included in prices, cost-reimbursements, or a settlement under the contract to which it is allocable; i.e., a cost tested for reasonableness, allocability and consonance with expected price computation principles.

d. Urgency of the Requirement

The APMs claim that the S.A. DoD projecting process is affected by many delays. These delays cause requirements to be urgent. Urgent requirements result in the agency being required to incentivize contractors to deliver early. The early delivery is required to meet urgent requirements allowing Armscor to award contracts on all budgeted funds in time. Armscor incentivizes contractors by allowing higher profit margin. Contractors are also allowed to claim higher cost than normal for material and services bought from their subcontractors. Armscor has no direct authority to rush the DoD process regarding the requirements. It only gives consultative assistance. The

agency should add contract types in its regulations as a process of reducing contract risk caused by delayed requirements and/or delayed project funding.

e. Adequacy of the Contractor's Accounting System

Armscor requires all its offerors to be accredited before they can be considered for contract award. The accreditation process is used to ascertain the contractor's financial health. This process can be directly linked with risk mitigation that is mainly addressed by allowing appropriate contract types and financing. Conditions for these vehicles are already available at Armscor. The only limitation is that the agency does not address contract types in its regulations. If Armscor regulations addressed the contract types in detail, it would be able to apply contract types other than the fixed-price type. Cost-reimbursement type contracts could require each offeror to submit certified cost or pricing data.

f. Concurrent Contracts

The APMs do assess if the offeror holds other Government and/or commercial contracts and the potential impact these contracts may have on the proposed contract. Armscor does not offer sufficient guidelines for the APMs to use the results of this assessment. As a consequence contractors take additional contracts and rely on temporary workers and subcontracts. When they default it becomes their problem since they are contracted on firm-fixed-price basis. The APMs have the expertise to acknowledge contractor's risks, but not all of them use it due to a lack of implementation guidelines.

g. Extent and Nature of Proposed Subcontracting

The law in South Africa mandates Government agencies to incentivize contractors who subcontract to small and disadvantaged businesses. The Government incentivizes prime contractors by allowing them some additional points during the evaluation process giving them higher chances of attaining the contracts.

h. Impact of Contract Types

Recognizing that there could be no regulation on contract type, the respondents were asked if this would impact the agency's ability to contract fairly with the local defense industrial base and international contractors.

Sixty percent of the respondents agreed that the absence of any language in the regulation concerning contract type in Armscor contracts could lead to an increase in contract risks for contracting parties. The rest of the respondents claimed that they were happy with the status quo of the Armscor regulations. They stated that minimal rules allow them to contract in a flexible manner. In response the researcher would argue that there are no rules regarding contract types. If an issue is of concern it has to be addressed. The amount of deliberation of the issue is another question. First the agency needs to set directions on contract types, but allow sufficient flexibility for APMs to tailor the contract to meet their unique needs.

i. Cost Accounting System

Cost-reimbursement type contracts require contractors to have an adequate cost accounting system. It is for this reason that respondents were asked to state if contractors have adequate cost accounting systems and can prepare cost and pricing data.

Furthermore, they were asked whether Armscor has the ability to audit contractor cost accounting systems.

All respondents stated that major defense contractors have adequate accounting systems that the Armscor regulation allows the requirements of cost and pricing data, and that Armscor has an internal audit division that addresses this issue. The shortfall on this issue is that the audit division consists of less than ten people who work with over 400 APMs on thousands of contracts placed annually. These auditors can only be fire fighting, as they cannot be actively involved on projects that appear to run without problems. The researcher argues that auditors are needed to be part of the project teams from the onset not when problems are experienced. Armscor has a strong presence of administrating officers who work hand in glove with the APMs. The main responsibility of the Armscor administration officers is to coordinate the project finance between the DoD, Armscor and contractors. There is an opportunity to train the administration officers in taking responsibility for auditing cost and pricing data. The administration office can also be involved in cost analysis and project monitoring cost-type contracts.

4. Contract Incentive

The term "incentive" is not used in Armscor procurement regulation but is mentioned in the DoD policy. Because of this, the questionnaire to Armscor gave details about contract types using incentives to motivate contractors in meeting the schedule, performance and cost, and the supply of products and services to the Government at the best value.

The APMs support the idea of incentives but do not want written regulations. They feel that unwritten regulations give an opportunity to be flexible in contracting.

Interestingly enough, unwritten policies may cause contractors to be insecure and refrain from contracting business with the Government while unwritten guidelines and procedures are also subject to misinterpretation. These unwritten policies also make it difficult for new Armscor employees to implement and reference. This misinterpretation was evident in the response to the questionnaire on which types of contracts Armscor allows. They all gave different responses to the question at hand.

5. Problems with the Status Quo

The respondents were asked if they experience problems with the way the agency's regulations are written, with little emphasis on contract types. They were also requested to justify their answers.

Only sixty percent responded to this question and all the responses were defensive. The majority of respondents said that there may be some problems with the agency's regulation, but are not sure if they are caused by the use of firm-fixed-price contracts only. To some respondents this question sounded as if the researcher was directly challenging the way they do things. As a result, the APMs felt that they were not ready to criticize their own system.

E. PROBLEMS CAUSED BY FIXED-PRICE TYPE CONTRACTS

As explained in Chapter III, in fixed-price contracts the Government and contractor agree on a fixed-price or a lump sum of money, for timely delivery of a given product or defined service in accordance with the specification. The profit or loss that the contractor experiences during the process to deliver the item is of no consequence to the Government unless it impacts performance, delivery and/or quality. The advantage to the contractor is the possibility of earning a higher amount of profit if actual costs are below

the original estimated cost. On the other hand, Armscor administration officers and audit controls are relaxed. Therefore, the real problem arises when the contractor cannot deliver as promised and its costs are above their projected / proposed price.

The contractor then needs to strongly persuade the Armscor Programme Managers (AMPs) to extend the delivery date or add more funding to the project. The contractor writes a justification to the AMP to request an extension of delivery period or to add more funds. This type of contract changes from a firm-fixed-price contract to a type that pays for the actual cost and some agreed amount of profit. According to the APMs the key word at Armscor is "motivation". Motivation is interpreted as justification in South Africa. Armscor can amend any contract arrangement as long as the contractor can justify it. The APMs estimated that over seventy percent of the firm-fixed-price contracts are adjusted annually.

F. PROBLEMS WITH THE DEFENSE INDUSTRY

As stated in Chapter II, Armscor and the biggest contractors in the defense industry were one entity until 1992. The S.A. DoD even today shares offices with both Armscor and one of the main contractors, Denel Corporation. These factors cause the relationship between Armscor and Denel employees to be dangerously close. It is evident that some contractors sometimes know about funds, for a planned project before the APM does. As a result, the new APM can become frustrated and powerless during contract negotiations with contractors who have inside information on the project. It is also evident that even some well-experienced APMs sometimes compromise Armscor policies when contracting with such contractors, since they are contracting with someone they know personally or with whom they may have shared offices before the separation.

G. PROBLEMS WITH PROJECT FUNDING

According to APMs, fixed-price contracts are the only appropriate contract types because of the way the funds are made available. Approval for project funding is sometimes delayed and, if made available, cannot be rolled over to the next fiscal year. As a result, some contractors (especially sole source) who have project budget information start to procure spares or manufacturing before the contract is placed in order to be able to meet the contract funding date. According to Armscor, any contractors proceeding this way do so at their own risk. These contractors contribute to Armscor reaching its goal of spending all the budgeted funds in the specific fiscal year, while risking the loss of their investments in projects not actually contracted.

H. CONTRACTOR INCENTIVES

The researcher could not identify any incentive arrangement that Armscor has with the contractor except for paying a higher profit premium to encourage contractors to deliver earlier than the contract time. For example, Armscor sometimes offers advance payment to encourage contractors to deliver early to help the agency meets its budget obligation of spending the project funds before the end of the fiscal year or cover for those contractors who may be delayed. The delays are sometimes caused by the late Armscor and DoD contract approval process. Advance payment helps contractors to have enough cash flow availability to meet their obligations.

I. CHAPTER SUMMARY

This chapter discussed and analyzed problems in the Armscor regulations, the South African DoD, the South African defense related industries and military acquisition, which is influenced by contract types presently used in the agency.

The next chapter provides the conclusions and recommendations; additionally it summarizes all research questions and identifies areas of further research.

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V. ARMSCOR MODEL STRUCTURE OF CONTRACT TYPES

A. INTRODUCTION

This chapter presents and describes the model structure of contract types that can be applicable to Armscor.

B. THE CONTRACT TYPE MODEL

The study proposes a contract type model that is presented in Table 3. This model structure addresses all categories of goods and services that are procured by Armscor and suggests appropriate contract types. This model can serve as a discussion element for Armscor.

The model addresses the following categories of goods and services that are procured by Armscor:

1. Commercial Items

The model recommends the use of firm-fixed-price contracts for acquiring commercial products.

2. Production

Firm-Fixed-Price contracts and fixed-price contracts that are subject to escalation formula are recommended for mature production products.

Fixed-Price-Incentive with Successive Targets contract is appropriate for early production of major weapon systems, while the Fixed-Price-Incentive with Firm Target contract is appropriate for acquiring major weapon systems based on a prototype. Fixed-Price-Incentive contracts require contracting parties to negotiate the FPI element that

helps provide a fair and reasonable incentive and ceiling. Under an appropriate incentive range, contractors will strive to improve their costs during the production process.

3. Research and Development Programs

This model distinguishes types of contracts for R&D effort depending on the type of contractor and recommends the appropriate contract as follows:

First, for R&D efforts with a non-profit organization, such as universities and Armscor facilities, a Cost-No-Fee (CNF) is recommended.

Second, for R&D with profit organizations the model recommends cost-reimbursement contract types, such as CPFF, CPIF and CPAF. In particularly CPFF contracts are suitable for preliminary exploration study and CPIF contracts cover advanced development and tests where profit incentive is likely to provide motivation for more effective management. Finally, CPAF contracts are recommended for prototype development.

Third, the model recommends FP-LOE contract for R&D when Armscor wants the contractor to devote resources as effective as possible. The FP-LOE contract requires the contractor to perform its "best effort". The delivered product or service for a FP-LOE is usually a study report.

Lastly, for low value R&D the Fixed-Price with Retroactive Price Redetermination contract is recommended.

4. Service Contracts

The award term contract is the most appropriate for awarding incentives for innovative contractors who provide excellent service and reduce cost to the Government.

The FPAF contract is applicable when the contracting parties cannot determine objective evaluation factors and, therefore, must base performance incentives on subjective factors. Appropriate subjective factors such as quality, timeliness and cost effectiveness may be considered for this situation. The CPAF contract may be used when the Government needs to reward contractors for good management or when there is a need for long-term relations with a contractor. The Government should have a pool of fees set aside for award fee contracts. Award term contracts are for Government services extending over a long period of time. This contract type incentivizes the contractor to improve quality, timeliness, cost effectiveness and management efficiency.

C. CHAPTER SUMMARY

This chapter presented and described the proposed model structure of contract types that may be applicable to Armscor.

The next chapter provides the conclusions and recommendations; additionally it summarizes all research questions and identifies areas of further research.

Application	Description	Contract type	Example
Commercial Items	Products with well defined specification and SOW	FFP	Office computers
Product & Services where there is a serious doubt of stability of the market and labor.	Contract in which its impossible to determine labor and material prices for the whole contract period.	FPE or Armscor Escalation formula	Products with high dependence on the rate of exchange
Long Term contract for long lead spare parts	Can arrive at a fair and reasonable price for the first period but cannot determine the cost for the whole period.	FPRP	Spare Parts with varying quantities per period
Low value R&D (R 100,000 or less) and for low rate initial production	Where contracting parties can agree on a ceiling price and upon completion negotiate a final price.	FPRR	Acquisition of low cost Software
R&D Investigative study in a specific area	Where "best effort" is required. The deliverable is a study report.	FP-LOE	Contract to ascertain feasibility of a new alloy
R&D with non-profit educational institution and Armscor Facilities	Contract for the use of university and Armscor facilities	Cost-No-Fee	Contracts with Gerotek
R&D with either non-profit or profit organization	Contract where each party bears a portion of the cost risk. Technology developed under this contract is applicable to commercial contracts.	Cost Sharing	Development of a vehicle for the taxi industry
Preliminary study where level of effort is unknown	Contracts with vague scope and indefinite specifications	CPFF	Development and test
Major weapon systems based on a prototype	Contracting parties can negotiate FPI element that will help provide a fair and reasonable incentive and ceiling. Uses objective formula.	FPIF	Major weapon systems
Major weapon systems (Low rate initial production)	Contracts with sufficient data to negotiate initial targets only.	FPIS	Major weapon systems
Development and test contract for major weapon systems	Where profit is likely to motivate the contractor to keep the cost down	CPIF	Major weapon systems
Service contracts	For contractors who constantly improve on quality, timeliness, cost effectiveness and good management	Award Term	All Service contracts
Engineering and design services, maintenance and repair contracts	Where fixed labor rates and material costs can be specified.	T&M	Contract with Telkom, Eskom[5] etc.

Table 3. Proposed Armscor Model Structure of Contract Types.
Source: Developed by the Researcher.

[5] Geroteck is an Armscor owned research facility. Eskom is the state owned Electricity Company while Telkom is a telecommunications company with the state owning the most shares.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. INTRODUCTION

The purpose of this chapter is to present conclusions and recommendations derived from the research, answer primary and subsidiary research questions and suggest areas of further research.

B. CONCLUSIONS

The conclusions are a sequence of analytically drawn findings based on the research conducted into Armscor regulation and specific contract types used to mitigate risk. The conclusions are cited first, followed by justification of that conclusion.

1. Conclusion #1

<u>The policy of the Republic of South Africa regarding Armscor needs to be updated to complement the new development in the DoD</u>.

The study shows that the Armscor policy on defense procurement is based on the Armscor Act of 1968. South Africa has experienced a lot of changes, which are not fully incorporated into this policy. One of the changes includes the formation of the defense Secretariat as an accounting office for the Department of Defense. The Government has transferred some activities, which were previously Armscor's responsibilities to the Secretary of Defense. The old DoD policy regards Armscor as the direct responsibility to the Minister of Defense and having the same status as the DoD. Armscor's regulations are based on this policy while the new DoD policy regards Armscor as its agency.

2. Conclusion #2

Acquisition of defense systems by Armscor is gradually changing from a mainly domestic focus to both international and domestic procurement.

The research shows that South Africa was acquiring systems mainly from the domestic market as a result of sanctions. Today the country is acquiring the best available systems worldwide. Armscor has since become an international procurement agency for the South African Department of Defense.

3. Conclusion #3

The use of just the firm-fixed-price contract and fixed-price subject to escalation formula does not allow Armscor to acquire systems and services effectively and efficiently.

The research shows that the Armscor regulation recommends the use only of fixed-price contracts which makes it impossible to acquire products and services at best value especially when there uncertainties exist. The study shows that FFP contracts are applicable when there is adequate competition, the cost of performance is reasonably predictable and when adequate functional or detailed specifications are available.

4. Conclusion #4

The Armscor regulation elaborates on penalties imposed on contractors who under-perform, but does not address incentives for contractors who excel by introducing innovation or cost reduction measures into the contracting system.

The study shows contracting on a fixed-price basis only may lead to late delivery of products and services. The agency penalizes contractors who deliver late but do not necessarily incentivize those who make an effort to deliver ahead of time.

5. Conclusion #5

Armscor contracting model is very effective with regards to central acquisition of product and services for all branches of Service.

According to the study, acquisition by a central body like Armscor sets the basis for acquisition of interchangeable products and services for the Army, Navy and Air Force. Introduction of new contract types will make the system more efficient by incentivizing contractors to reduce cost.

6. Conclusion #6

Armscor writes firm-fixed-price contracts, but administers them as cost-reimbursement contracts.

The study shows that Armscor writes firm-fixed-price contracts even where the technical and schedule risks are so high that the cost risk is too large for the contractor to assume. As a result, the agency is forced to amend the contracts to accommodate the contractor risks. The cost-reimbursement contract is the most appropriate in such conditions.

7. Conclusion #7

The DoD personnel have a perception that contractors are overcharging the Government to cover uncertainties.

The research acknowledges that contractors do include contingencies in their price proposals to cover for performance risk, thus raising the price of the contracts. Selecting the appropriate contract type can minimize these considerations.

C. RECOMMENDATIONS

The following recommendations are provided as a result of this research:

1. Recommendation Regarding the Government Regulation on Procurement

Firstly, it is recommended that the Government of the Republic of South Africa review the Armscor Act to accommodate the present changes and align the agency with other Government agencies. In introducing these changes the Government needs to consider the interests of all stakeholders, which include the long term and experienced Armscor personnel, the newly employed and all other concerned stakeholders.

Secondly, the use of Armscor's contracting experience and success will facilitate the formulation of the new Government Acquisition Regulation (GAR) documents for all Government acquisition, primarily the State Tender Board. Every Government agency should acquire products and services, in accordance with the GAR while allowing agencies to add policies, procedures and provisions applicable to their environments. Any additions should follow the same organization as the GAR. A central organization should be appointed to oversee and update the GAR and its supplements regularly. The State Tender Board should pioneer the use of the GAR. Individual Government agencies can supplement the GAR in their environment: for examples the Defense GAR for the Department of Defense, Welfare GAR for the Department of Welfare and Police GAR for the Safety and Security Department.

2. Recommendation Regarding Contracting with the Government Agencies

Contracts with all agencies of the Government should be written in the name of the Government and the Contractor. The Government should prohibit the agencies from

writing contracts in their names, for example the Armscor Contracts. This will help eliminate the misunderstanding between Armscor and the Department of Defense regarding the project leaders. The present Armscor regulations regard the Armscor Programme Manager (Project Manager) as the project leader because the contract is between Armscor and the Contractor. The DoD, however, recognizes its Project Officer as the leader since he or she is acting on behalf of the user and provides finance.

3. Recommendation Regarding Contract Types

It is in the best interest of Armscor to ensure that all Armscor Programme Managers are properly trained to select the appropriate contract type. The contract type model depicted in Table 3 can serve as a guiding tool to the APMs. The model recommends eleven additional contract types applicable to Armscor. The recommended contract types are Fixed-Price with Prospective Price Redetermination, Fixed-Price with Retroactive Price Redetermination, Fixed-Price Level of Effort, Cost-No-Fee, Cost-Sharing, Cost-Plus-Fixed-Fee, Fixed-Price-Incentive with Firm Target, Fixed-Price-Incentive with Successive Targets, Cost-Plus-Incentive-Fee, Award-Term, and Time and Material Contracts.

The agency should also incorporate the definitions of concepts and terms described in Appendix C. These changes will reduce the contractors' risk and allow Armscor to contract on best value.

4. Recommendation Regarding Incentives in Contracting

The study shows the use of firm-fixed-price contracts for acquiring complex systems does not incentivize contractors to reduce cost. Contracting on a fixed-price basis encourages contractors to continuously increase the contract price to cover their

performance risk. The study could not identify mechanisms used by the agency to encourage contractors to reduce cost. It is recommended that incentives be structured into contract types that motivate contractors to control costs.

5. Recommendation Regarding no Adjustment to Price of Firm-Fixed-Price Contract

The research shows the agency adjusts contract prices for firm-fixed-price contracts to provide the contractor with a reimbursement for cost incurred plus a fixed percentage of those costs as profit. Such an arrangement leads to the contractor's profit to be directly proportional to the cost incurred, which leads to the positive incentive for the contractor to drive up the cost. The contract type used in such a case is the cost-plus-a-percentage of cost, which is prohibited by the U.S. Federal law in U.S. procurements because the contractor can continuously increase costs in order to receive more profit. It is recommended that firm-fixed-price contracts not be adjusted for cost increases.

6. Recommendation Regarding Cost and Pricing Data

The research shows that it is important to conduct both price and cost analysis when utilizing cost-reimbursement contracts. The Armscor regulations should provide for the submission of detailed certified cost and pricing data and outline the specific circumstances when these data should be required or waived.

7. Recommendation Regarding Training

The study shows the Armscor allow amendment of firm-fixed-price contracts to address uncertainties. The contract treatment in Appendix C defines firm-fixed-price as an agreement to pay a price for delivery of specific products and services. The Armscor Programme Managers should receive training on contract risk management techniques, incentive arrangements and contract type selection factors. Furthermore, the agency's

administration officers should be trained to monitor contracts, which use cost–reimbursement arrangements.

8. Recommendation Regarding Armscor Relations with Contractors

The study shows that the relationship between Armscor and its sole source contractors is dangerously close. Such a relationship limits the opportunity for open competition and may create the perception of corruption and favoritism. The researcher recommends Armscor develop an arms length relationship between the corporation and its contractors.

D. RESEARCH QUESTIONS

Answers to the research questions posed in Chapter I are provided below:

1. Primary Research Question

What are the critical issues and problems involved in the contracts used by Armscor and how might the contracting process be enhanced through a broader use of contract types?

The five critical issues and problems involved in the Armscor contracting process are mentioned below:

First, the Armscor contract regulations are not all encompassing which leads to varying interpretations by the Armscor Programme Managers and contractors. The South African Government needs to review the legislation on Armscor and incorporate changes that have affected the country and the world with regards to contracting. The responsibilities of the stakeholders (DoD, MoD and Armscor) should be clearly stated.

Second, a perception exists that contractors are overcharging the Government to cover uncertainties. Understandably, when there is high uncertainty, firm-fixed-prices are

not applicable. The proposed contract type model provides guidance on appropriate contract type.

Third, Armscor processes a large number of contract modifications (amendments) as a result of the APMs' attempt to address all issues in a specification upfront. The agency should involve contractors at the early stage and give them incentives to propose methods that reduce costs. Incentive contract types facilitate the attainment of this goal.

Fourth, there is a limit on competition in Armscor contracts. The agency should train contractors on the proposed contract types, and initiate steps to reduce the cycle time and administration burden with the acquisition of commercial products, increasing competition and relying more upon commercial specifications and standards. Reduce the time and complexity on competitive acquisition of commercial products. This can be achieved by soliciting offers with performance specifications.

Fifth, contractors are frequently penalized for late delivery. The reason may be that they cannot estimate an accurate delivery schedule because of uncertainty and they cannot renegotiate their contract. The agency can solve this problem by introducing the eleven proposed contract types followed by training the APMs, the Armscor administration officers and contractors on the types of contracts.

2. Subsidiary Questions

What is the current state of the Armscor contracting system concerning contract types?

Armscor has a great deal of international experience in selling weapon systems to international users, but not buying internationally. As a result the Armscor procurement process is written based on acquiring systems and services in South Africa. It should be

revisited to incorporate changes that encourage incorporation of best international practices.

Armscor contracting regulations K-STD 10 and KSTD 20 are not all encompassing. Armscor should write an all-encompassing regulation based on the new policy that covers all areas of contracting.

What are the major categories of systems, goods and services that Armscor processes and what implications do these categories have for contract types?

Armscor procures commercial products, services (including logistics and maintenance), different forms of research and development, program development and production of systems. The agency does not have policies, procedures and guidelines in selection of contract types. As a result, the APMs may not always exercise sound judgment selecting appropriate contract types applicable to the circumstances of an acquisition they are contemplating.

What are the current problems and issues that limit Armscor's procurement capability and the potential use of alternative contract types?

The study shows that not all Armscor contractors have an appropriate Cost Accounting system that allows the agency to conduct cost estimation and analysis. The Armscor regulation does not address contract types, which makes it difficult for the contractor to negotiate and incorporate other than fixed-price type contracts.

What types of contracts might be suitable for use by Armscor?

The Armscor regulations should be rewritten to incorporate eleven additional contract types. The proposed contract types are in addition to the firm-fixed-price and the fixed-price with economic price adjustments that are presently in use. The appropriate contract types are listed Table 3.

What changes can be incorporated into current Armscor regulations governing contract types?

The Armscor regulations should make provisions for contract types. The terms that are defined in the contract treatment regulation in Appendix C should be incorporated into the Armscor regulations.

What model structure of contract types should Armscor utilize?

The proposed model structure that is suitable for Armscor is presented in Table 3. This model can serve as guidance to writing a regulation on contract types.

E. SUGGESTIONS FOR FURTHER RESEARCH

A study should be conducted to detail conditions for the use of dual use technology within the South African defense industry. Such research may reduce the dependency of the South African defense contractors on Government or Armscor contracts.

APPENDIX A. QUESTIONNAIRE ON CONTRACT TYPES

COVER LETTER AND QUESTIONNAIRE ON CONTRACT TYPES USED BY ARMSCOR.

Mr. Peter Lebelo
Naval Postgraduate School
2 University Cir SGC 1268
Monterey, CA 93943-2657

To: Armscor / DoD

Dear ____________,

Thank you for your time and effort to respond to my query. I am conducting research for my master's thesis, and I hope you can help me with my research. Here's a rundown on what I'm researching.

My Thesis is "**A study of contract types used by the Armscor**"

General Area of Proposed Thesis Research:

This research intends to examine contract types utilized by Armscor for procurement of different categories product and services. Contracts have terms and conditions, values, parties, outcomes and environments. Contract types are used to meet complicated procurement requirements.

Contract types vary according to

1. The degree and timing of the responsibility assumed by the contractor for the costs of performance and
2. The amount and nature of the profit incentive offered to the contractor for achieving or exceeding specified standards or goals.

The contract types are grouped into two broad categories: fixed-price contracts and cost-reimbursement contracts. The specific contract types range from firm-fixed-price, in which the contractor has full responsibility for the performance costs and

resulting profit (or loss), to cost-plus-fixed-fee, in which the contractor has minimal responsibility for the performance costs and the negotiated fee (profit) is fixed. In between are the various incentive contracts, in which the contractor's responsibility for the performance costs and the profit or fee incentives offered are tailored to the uncertainties involved in contract performance.

The benefits of the study:

This study will provide Armscor and the South African defense industry with a base of understanding and interpreting contract types. The study will also encourage old and new contractors to participate in defense contracts. The latter will assist the contracting agency to acquire competitive goods and services.

QUESTIONS

The following questions are intended to assist in graduate research in the Management field. You may answer them anonymously but honestly.

A. In your opinion and experience with Government contracting does Armscor use the following types of contracts (Price Adjustment)? For which category of contract (R&D, Development, Production, Major Defense Acquisition, etc)

Contract Types and definitions	Answer
1. Firm-Fixed-Price contracts. (Fixed-Price Contract) • A Firm-Fixed-Price contract provides for a price that is not subject to any adjustment on the basis of the contractor's cost experience in performing the contract. This contract type places upon the contractor maximum risk and full responsibility for all costs and resulting profit or loss. It provides maximum incentive for the contractor to control costs and perform effectively and imposes a minimum administrative burden upon the contracting parties.	
2. Not fixed-price type contract subject to escalation (par 3.3 KP 0021)	
3. Not fixed-price as a result of fluctuation in the exchange rate. (Armscor KSTD-10)	
4. Ceiling price contract. Total amount is fixed but the unit prices or tariffs are not fixed. (Armscor K-STD 10)	
5. Time and Material contract. • A time-and-materials contract provides for acquiring supplies or services on the basis of direct labor hours at specified fixed hourly rates that include wages, overhead, general and administrative expenses, and profit and materials at cost, including, if appropriate, material handling costs as part of material costs.	
6. Labor-hour contracts. • A labor-hour contract is a variation of the time-and-materials contract, differing only in that the contractor does not supply materials.	
7. Letter contract • A letter contract is a written preliminary contractual instrument that authorizes the contractor to begin immediately manufacturing supplies or performing services.	
8. Fixed-Price incentive contracts A fixed-price incentive contract is a fixed-price contract that provides for adjusting profit and establishing the final contract price by a formula based on the relationship of final negotiated total cost to total target cost.	
9. Fixed-Price contracts with prospective price redetermination • A fixed-price contract with prospective price redetermination provides for (a) a firm-fixed-price for an initial period of contract deliveries or performance and (b) prospective redetermination, at a stated time or times during performance, of the price for subsequent periods of performance.	
10. Fixed-ceiling-price contracts with retroactive price redetermination. • A fixed-ceiling-price contract with retroactive price redetermination	

provides for (a) a fixed ceiling price, and (b) retroactive price redetermination within the ceiling after completion of the contract.	
11. Cost-sharing contracts. • A cost-sharing contract is a cost-reimbursement contract in which the contractor receives no fee and is reimbursed only for an agreed-upon portion of its allowable costs.	
12. Cost-plus-incentive-fee contracts. • A cost-plus-incentive-fee contract is a cost-reimbursement contract that provides for an initially negotiated fee to be adjusted later by a formula based on the relationship of total allowable costs to total target costs.	
13. Cost-plus-award-fee contracts. • A cost-plus-award-fee contract is a cost-reimbursement contract that provides for a fee consisting of (a) a base amount (which may be zero) fixed at inception of the contract and (b) an award amount, based upon a judgmental evaluation by the Government, sufficient to provide motivation for excellence in contract performance.	
14. Cost-plus-fixed-fee contracts. • A cost-plus-fixed-fee contract is a cost-reimbursement contract that provides for payment to the contractor of a negotiated fee that is fixed at the inception of the contract.	
15. What other types of contracts are used at Armscor?	

B. How many contracts does Armscor place per year?

C. Of all contracts placed by Armscor per year how many of them are fixed, not fixed etc? Or what percentage of them are fixed or not fixed?

D. Does Armscor have regulations, laws guidelines and policies with regards to contract types selection?

E. What is the impact of contract types to the defense industrial base and potential contractors?

F. Does the Armscor Procurement Policy with regards to contract types impact its ability to buy and sell goods internationally?

G. How do the Armscor Programme Managers determine the adequacy of contractor cost estimates and cost accounting system?

H. Does Armscor have the ability to audit contractor cost accounting systems? (How does Armscor detect overruns and underuns on projects)

I. What vehicle does Armscor use to offer incentives for contractor performance?

J. What factors do the Armscor Programme Managers consider when selecting contract types?

K. Does Armscor distinguish between selecting contract types based the type of project e.g. R& D, Production, Service contracts, Major system acquisition, commercial products etc?

L. Does Armscor experience problems in the way contracts are selected? (Do you think that the procedure used by Armscor to select contracts is appropriate? Why?

Name ____________________________________

Department ______________________________

Address __________________________________

Email ____________________________________

Telephone number __________________________

APPENDIX B. ILLUSTRATION OF CONTRACT TYPES

ILLUSTRATION OF CONTRACT TYPES

1. Firm-Fixed-Price Contract

The Government agency and Bontle Catering Company agree on a price of R100, 000[6] to supply lunches for its employees, based upon the anticipated costs of R90, 000. It is unlikely that Bontle's actual costs will amount to exactly R100, 000. If Bontle spends less, its profit will increase. If Bontle spends more than R90, 000, its profit will be reduced. Figure 5 below illustrates the FFP contract with a contract price of R100, 000.

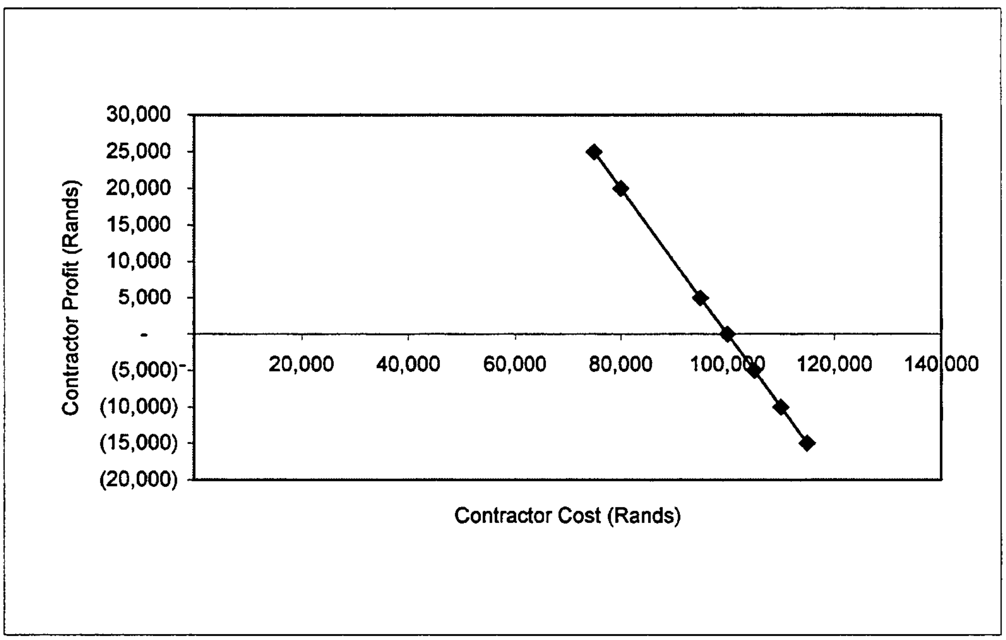

Figure 5. Firm-Fixed-Price Contract.
Source: Developed by the researcher.

[6] A Rand (R) is the South African currency unit, R1= 100 cents.

2. Fixed-Price with Economic Price Adjustment Contract

The agency places a contract with Rooivalk (Pty) Ltd for the development of a fighter helicopter. The agency realizes that Rooivalk will ask for a very high price due to a possible increase in the labor prices and material. Furthermore, Rooivalk anticipates that a very high price may cover an extraordinary increase in price of material and labor. The two contracting parties agree on an economic price adjustment. Figure 6 below illustrates the FPE contract.

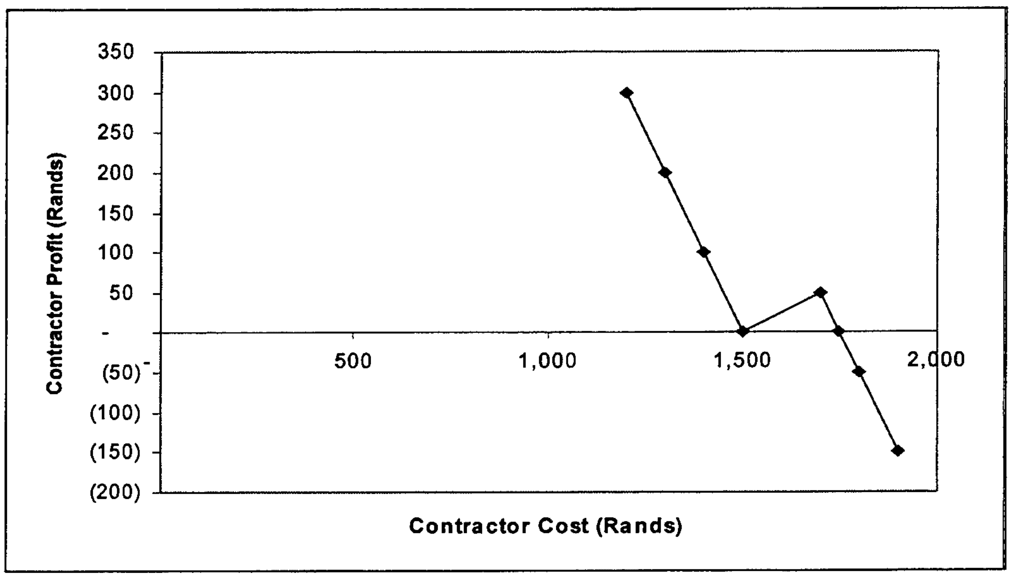

Figure 6. Fixed-Price with Economic Price Adjustment Contract
Source: Developed by the researcher

3. Fixed-Price with Prospective Price Redetermination Contract

The Government agency places a long-term contract with the Puso Defense System to deliver armored vehicles. Both parties negotiate, a reasonable price before the contract commences. Before the year ends, the parties agree on a price of R200, 000 per vehicle for the first year. At a later time in the first year the two contracting parties agree on a price of R185, 000 for the second year. The process would continue till the final year is priced. This approach takes advantage of the learning curve.

4. Fixed-Ceiling-Price with Retroactive Price Redetermination Contract

The Agency and Rooivalk (Pty) Ltd initially agree on a contract not to exceed a ceiling price of R 200,000. At the end of the contract the two parties negotiate a final price of R180, 000.

5. Fixed-Price Level Of Effort Contract

The agency wants to ascertain the feasibility of a communication system for the South African National Defense Force in the Democratic Republic of the Congo. Dyadic System is a private company, operating from the University of North and is the only contractor that can perform the work. The two parties negotiate a fixed-price contract based on the estimated hours it will take to complete the project. At the end of the period, Dyadic delivers a report describing its research. The agency pays the contractor based on the effort than the results achieved. The agency lists categories of labor and number of hours to ensure receipt of the proper quantity of man-hours.

6. Fixed-Price-Incentive with Firm Target Contract

Given:

Target Cost (TC)	R 500,000
Target Profit (TP)	50,000
Target Price	R 550,000
Ceiling Price (CP)	R 650,000

Share Ratio 80/20 (Government/ Contractor Share Ratio)

Final Negotiated Cost	R 550,000	
Target Cost	R 500,000	
Difference	50,000	(increase in cost)

Contractor receives 20% or R 10,000 of the R 50,000 as a difference in profit:

Target Profit	R 50,000
Contractor Share	- 10,000
Difference	R 40,000

The Government receives 80% or R 40,000 of the R 50,000 for an increase in price:

Final Negotiated Price	R 550,000
Final Profit	+ 40,000
Final Price	R 590,000
Target Price	- R 550,000
Price Increase	R 40,000

The effect of price ceiling turns the contract into a firm-fixed-price at a point called the "Point of Total Assumption (PTA)". The PTA is a point at which R1 more of the incurred cost equals R1 reduction in profit. In other words, the share ratio becomes 0/100 (Government/Contractor). The following formula is used to calculate the PTA: The PTA is equal to the Ceiling Price (CP) minus the Target Price (TP) divided by the Government share plus the Target Cost (TC). Using the above information, the PTA can be presented as follows:

$$PTA = \frac{CP - TP}{\text{Govt share}} + TC$$ **Formula 2**

$$PTA = \frac{650{,}000 - 550{,}000}{80\%} + R\ 500{,}000$$

PTA = R 625,000

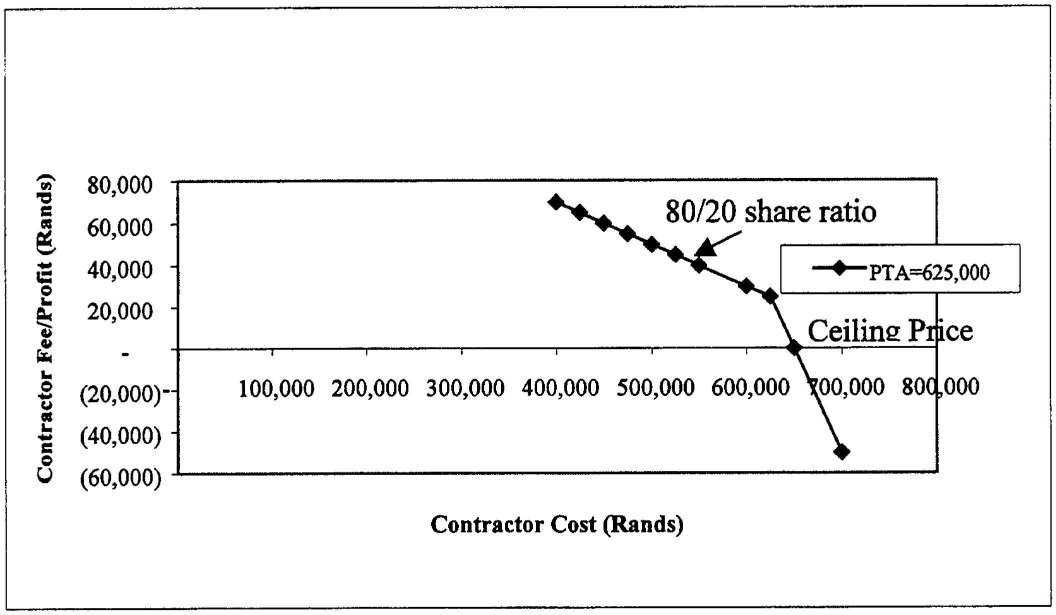

Figure 7. Fixed-Price-Incentive with Firm Target Contract.
Source: Developed by the researcher

7. Fixed-Price-Incentive with Successive Targets Contract

Given:

Initial Target Cost (ITC)	R 300,000
Initial Target Profit (ITP)	30,000
Target Price	R 330,000
Ceiling Price (CP)	450,000
Share Ratio	80/20
Firm Target Profit Floor	R 25,000
Firm Target Profit	55,000
Firm Target Cost	R 300,000
Cost/Share Ratio	80/20

The PTA equals the Ceiling Price (CP) minus Target Price (TP) divided by the Government share plus Target Cost (TC).

Using the above information, the PTA can be calculated as follows:

$$PTA = \frac{CP - TP}{\text{Govt Share}} + ITC \qquad \textbf{Formula 3}$$

$$PTA = \frac{450{,}000 - 330{,}000}{80\%} + 300{,}000$$

$$PTA = R\ 450{,}000$$

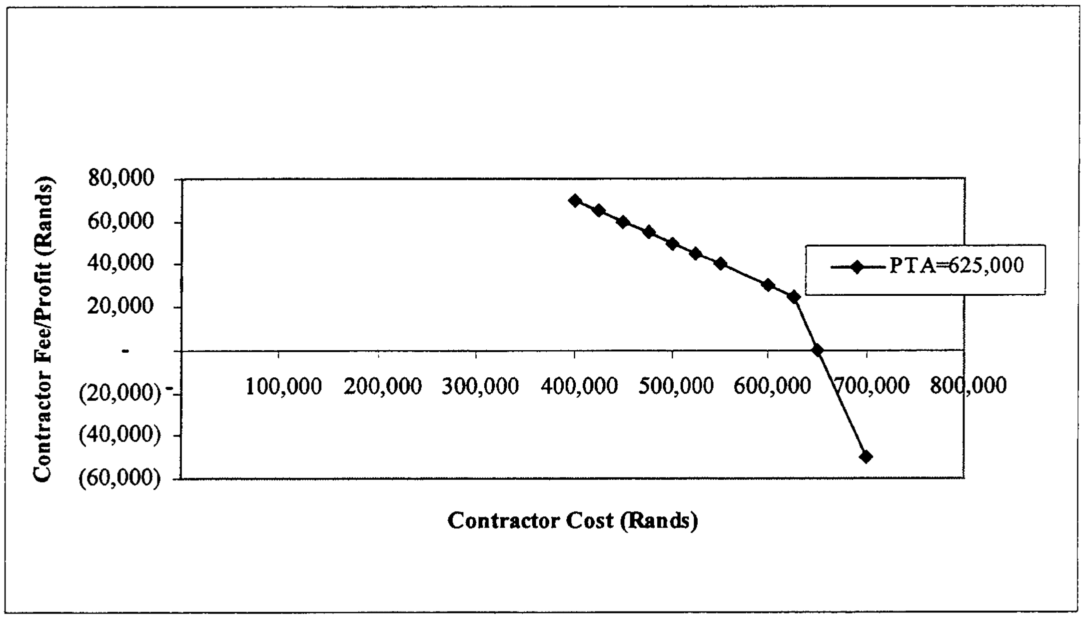

Figure 8. Fixed-Price-Incentive with Successive Targets Contract.
Source: Developed by the researcher

8. Cost-No-Fee Contract

The agency awards a R250, 000 cost contract to the Wits University. The University cannot spend more than R250, 000 on the effort unless the agency increases the limitation of liability. Wits will not receive any fee or profit.

9. Cost-Plus-Fixed-Fee Contract

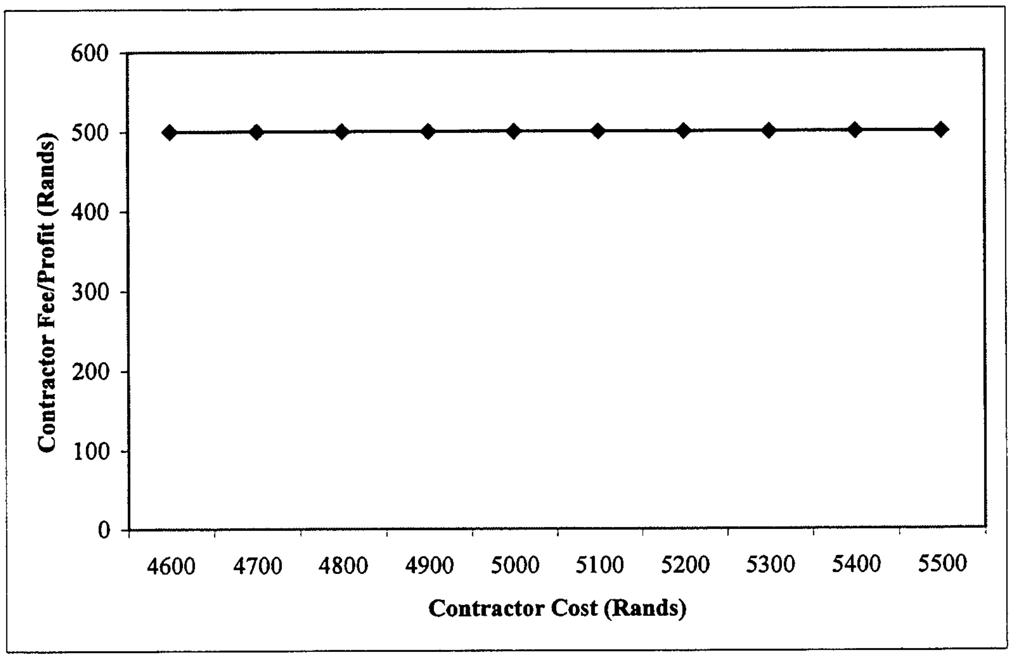

Figure 9. Cost-Plus-Fixed-Fee Contract.
Source: Developed by the researcher

The agency awards a R500, 000 cost contract to the Pretoria University for environmental exploratory research. The agency pays the university for all allowable and allocable costs incurred in performance of the contract. In addition, the Government agrees to pay the contractor a fixed fee of R8, 000 above the cost as a fee (profit) for doing work.

10. Cost-Plus-A-Percentage-of-Cost Contract

The agency contract on the basis of cost-reimbursement for performance, plus an additional fixed percentage of costs as profit. The graph below shows that profit is in direct proportion with costs. This type of contract should never be used, as there is no incentive for the contractor to control costs.

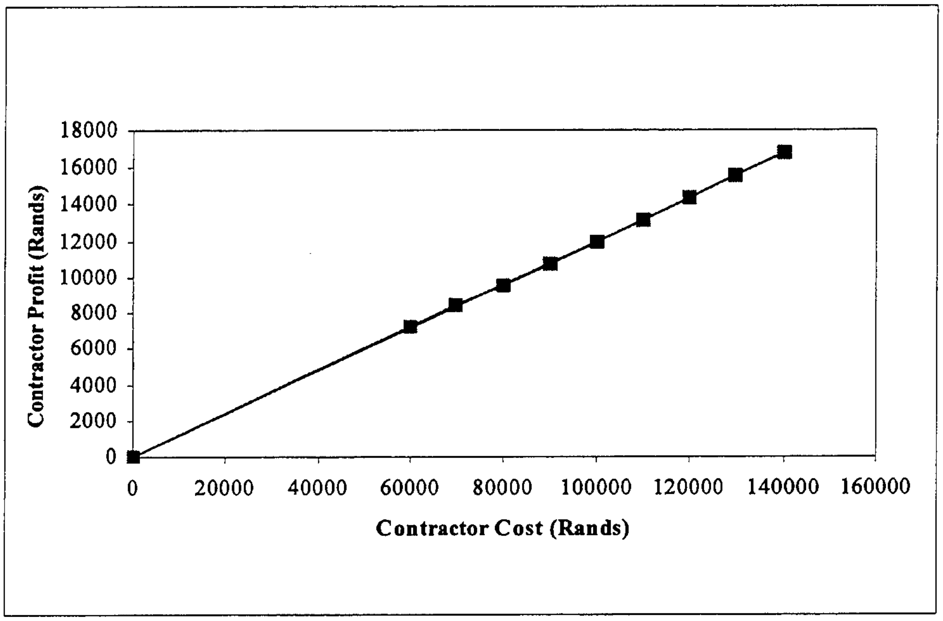

Figure 10. Cost-Plus-A-Percentage-Of-Cost Contract.
Source: Developed by the researcher

11. Cost-Plus-Incentive-Fee Contract

A cost-plus-incentive-fee contract is a cost-reimbursement contract that provides for an initially negotiated fee to be later adjusted by a formula based on the relationship of total allowable costs to total target costs. In the example below the Government contractor's share ratio operates between R700,000 and R1,500,000. The range is, therefore, called the range of incentive effectiveness. Outside the range the contractor

receives either the maximum or the minimum fee. At these points the contract becomes a CPFF at either end of the fee spectrum.

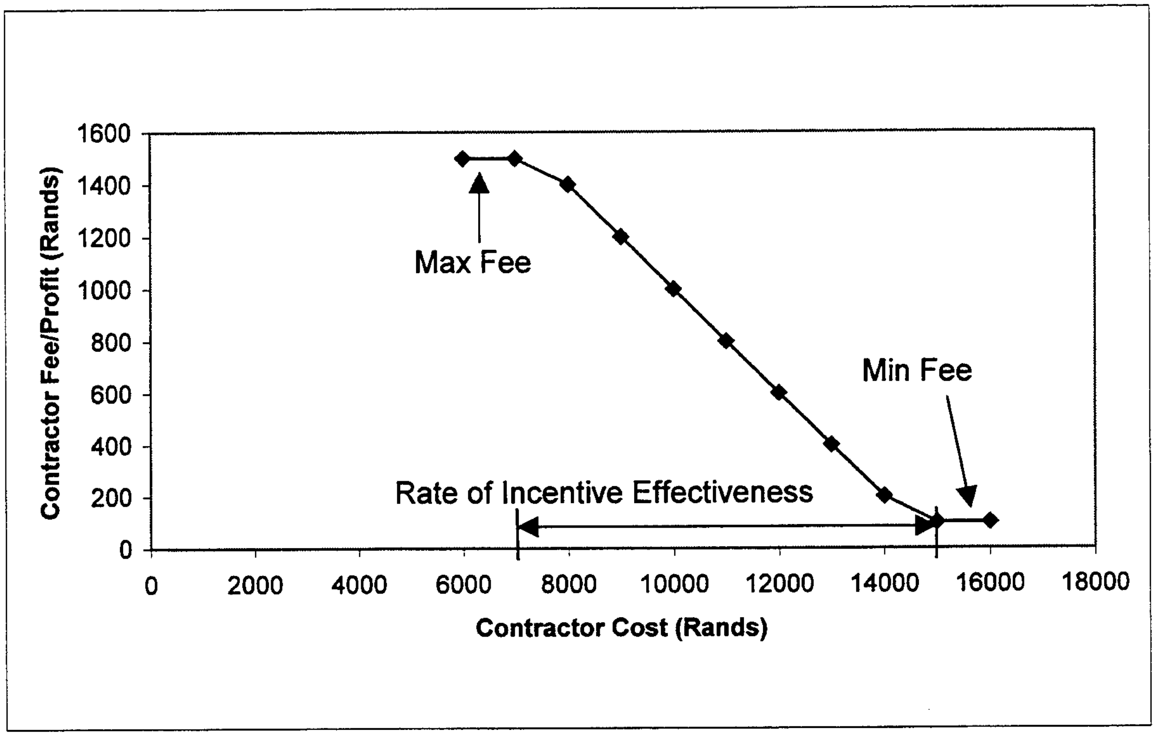

Figure 11. Cost-Plus-Incentive-Fee Contract.
Source: Developed by the researcher.

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APPENDIX C. CONTRACT TREATMENT REGULATION

PROPOSED AMENDMENT TO THE CONTRACT TREATMENT REGULATION

A. General

Proposed terms required for amending the Armscor regulation.

This section defines terms commonly used in the contracting regulation.

1. **Actual cost** means the amount determined on the basis of costs incurred, as distinguished from forecasted costs.

2. **Allocable cost** means a cost that is assignedable or chargeable to one or more cost objective in accordance with the relative benefits received or other equitable relationship.

3. **An allowable cost means** any cost which can be included in prices, cost-reimbursements, or settlements under the contract to which it is allocable. It is a cost that is tested for reasonableness, allocability and consonance with expected price computation principles.

4. **Audit** means a review and evaluation of the contractor or subcontractor's proposal by any or all audit personnel.

5. **A Contract** means a mutually binding legal relationship obligating the contractor to furnish the supplies or services (including construction) and Government to pay for them. There are five conditions of having a valid contract:

   a. There should be an offer and an acceptance.
   b. It should be within the law.
   c. Contracting parties should be competent and have mutual understanding.

d. There should be considerations.
e. Government contracts should be in written form.

6. **Contracting** means purchasing, leasing or otherwise obtaining products or services from non-Government sources. Contracting includes description (but not determination) of products and services required, selection and solicitation of sources, contract preparation and award, and all contract administration. Contracting excludes making grants or corporate agreements.

7. **Contracting Officer** means a person with the authority to enter into, administer, or terminate contracts and make related determinations and findings.

8. **Contract Office** means an office that awards or executes a contract for products and services and/or performs post award functions.

9. **Contract type** refers to a specific price arrangement employed for the performance of work under contracts. Specific pricing arrangements include fixed-price contracts, and cost-reimbursement contracts.

10. **Contract, Fixed-Price** provides for a firm-price to the Government, or in appropriate cases, and adjustable price. Examples of fixed price contracts include firm-fixed-price and fixed-price incentive firm contracts. A fixed-price contract is usually awarded to the responsible and responsive contractor. The force of competition ensures fair and reasonable pricing and protects the Government paying too much.

11. **Contract, Firm-Fixed-Price (FFP)** is an agreement to pay a specified price for delivery of specific products and services.

12. **Contract, Fixed-Price with Economic Price Adjustment (FPE)** is a contract that protects the Government and the contractor against wide fluctuations in labor or material costs when market conditions are unstable.

13. **Contract, Fixed-Price with Prospective Price Redetermination Contract (FPRP)** is a contract that which allows the Government to pay a fixed-price for products or services, but the price is subject to revision at stated times during performance of the contract. At the time of redetermination, the contractor submits a proposal based on actual costs of performance and the estimated cost of any incomplete work. After a Government audits, the contractor negotiates a revised price, which could be higher or lower than the initial price but cannot exceed the ceiling price.

14. **Contract, Fixed-Price with Retroactive Price Redetermination (FPRR)** is a contract that provides for a ceiling price and retroactive redetermination after completion of the contract.

15. **Contract, Fixed-Price Level of Effort (FFP-LOE)** a contract type that requires the contractor to provide a specified level of effort, over a stated period of time, or work that can only be stated in general terms with the Government paying the contractor a fixed amount.

16. **Contract, Cost-No-Fee (CNF)** is a cost-reimbursement contract in which the contractor receives no fee.

17. **Contract, Cost-sharing (CS)** provides for the Government to pay only a portion of allowable cost as mutually agreed by the contracting parties. The contractor absorbs a portion of the cost with expectations of gaining benefits outside of the instant contract.

18. **Contract, Cost-Plus-Fixed-Fee (CPFF)** is a contract type in which the contractor receives the same fee, regardless of whether the contractor's actual costs are greater or less than the estimated cost.

19. **Contract, Fixed-Price-Incentive with Firm Target (FPIF)** allows the contract elements to be negotiated from the outset using target cost, target profit, ceiling price and sharing formula.

20. **Contract, Fixed-Price-Incentive with Successive Target** is similar to a redetermination contract. The difference is that a fixed-price incentive contract contains a target cost, a target profit, a price ceiling, and a formula by which the Government and contractor share any differences between target costs and actual final costs, as negotiated.

21. **Contract, Cost-Plus-Incentive-Fee Contracts (CPIF)** is a more flexible contract type than the FPI. The Government and the contractor agree on a target cost, a target fee, and a sharing formula for determining the final fee. The formula accommodates an adjustment in the fee, based on any difference between the target cost and the total allowable cost of performing the contract.

22. **Contracting Officer,** means a person with the authority to enter into, administer, and make related determinations and findings. The term includes certain authorized representatives of the contracting officer acting within the limits of their authority as delegated by the contracting officer.

23. **Cost analysis** means the review and evaluation of the separate cost elements and proposed profit of a contractor's cost or pricing data and the judgmental factors applied in projecting from the data to the estimated costs, in order to form an opinion on the degree to which the proposed costs represent what the contract should cost, assuming reasonable economy and efficiency.

24. **Cost or pricing data** means all facts as of the time of price agreement that prudent buyers and sellers would reasonably expect to affect price negotiations significantly.

25. **Cost-Reimbursement contract** means basic category of Government contract in which the pricing arrangement involves the Government's payment of "allowable" costs incurred by the contractor.

26. **Contract Price** means cost plus any fee or profit applicable to the contract type.

27. **Expected (Estimated) cost** means the determined cost by a contracting officer in order to contract fixed types contracting prior to negotiation.

28. **Fair and reasonable** means a price that is fair to both parties considering the agreed upon price conditions, promised quality and timeliness of the contract performance.

29. **Model,** is a simplified representation of some aspect of the real world.

30. **Price analysis** means the process of examining and evaluating a proposed price without evaluating its separate cost elements and proposed profit.

31. **Reasonable cost** means a cost that in nature and amount does not exceed what would be incurred by a prudent businessperson in the conduct of competitive business.

32. **Reimbursed cost** means the final redetermined cost to be paid by the Government to the contractor for the contract performance on the basis of actual incurred costs, mostly used in cost-reimbursement contracts.

33. **Reimbursed price** means the contract price that is finally determined for the cost-reimbursement contract types on the basis of reimbursed cost.

34. **Technical analysis** means the examination and evaluation by personnel having specialized knowledge, skills, experience, or capability in engineering, science, or management of proposed quantities and kinds of materials, labor, processes, special tooling, facilities, and associated factors set forth in a proposal in order to determine and report on the need for and reasonableness of the proposed resources assuming reasonable economy and efficiency.

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